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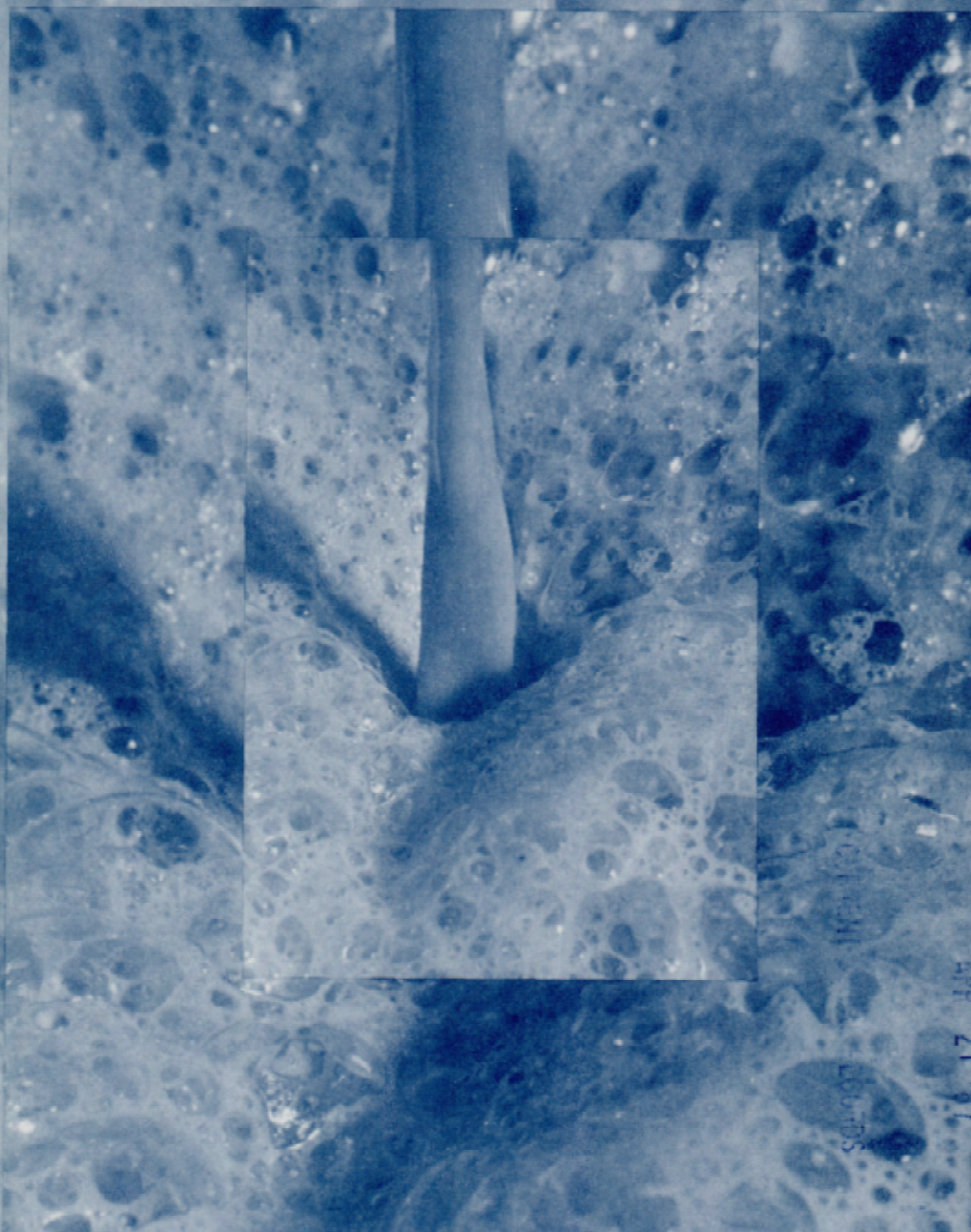
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Costs of Producing Milk, 1975-84

Carolyn Betts



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ABSTRACT

Costs of producing milk rose 53 percent in 1975-84 to \$13.57 per hundredweight (cwt). Cash (out-of-pocket) costs rose 56 percent to \$10.64 per cwt. Cash receipts, measuring gross production value, peaked in 1981 at \$14.94 per cwt compared with \$9.23 in 1975. Production costs in the Pacific region were more than \$1 per cwt lower than costs in other regions every year during 1975-84. Appalachia and the Corn Belt had the highest costs. In 1983, the Economic Research Service (ERS) revised its cost-of-production estimating procedures and cost-and-return budget formats to incorporate new concepts and methodologies. This report describes those revisions and re-estimates milk production costs for 1975-80 using the new methods and formats to provide comparable estimates for 1975-84.

Keywords: Cost of production, costs and returns

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SUMMARY

Costs of producing milk rose during 1975-84 to \$13.57 per hundredweight (cwt), according to revised cost-of-production (COP) estimating procedures and cost-and-return budget formats. Other highlights of this report include:

- o Cash (out-of-pocket) costs rose 56 percent during 1975-84 to \$10.64 per cwt. Major increases in prices paid for such factors as fuel and energy in 1979 and 1980 helped escalate these costs.
- o Cash receipts, which measure gross production value, peaked in 1981 at \$14.94 per cwt, compared with \$9.23 in 1975.
- o Costs of producing milk in the Pacific region rose from \$7.57 per cwt in 1975 to \$11.44 per cwt in 1984, the smallest increase in all regions. Production costs were more than \$1 per cwt lower than costs in other regions every year during 1975-84 and \$1.62 per cwt below U.S. average costs for the period.
- o Appalachia and the Corn Belt had the highest costs for 1975-84. The Corn Belt's costs per cwt increased \$5.36, 14 percent above the U.S. average increase and the largest increase for all regions.

In 1983, the Economic Research Service (ERS) revised its COP estimating procedures and cost-and-return budget formats to incorporate new concepts and methodologies. ERS began applying the new procedures and formats to COP estimates in 1981. This report describes those revisions and re-estimates milk production costs for 1975-80 using the new methods and formats to provide comparable estimates for 1975-84. This consistent time series data can be used to track changes in the cost structure of the dairy industry over time and to further research the dynamics of the dairy industry.

Major revisions in the procedures and formats include the following:

- o The addition of a cash receipts section and an economic costs section that includes allocated returns to nonland production assets, land, labor, and capital.
- o New procedures for calculating general farm overhead and interest as a percentage of receipts.
- o A new concept for estimating management as a residual return rather than a fixed rate.
- o The re-definition of regional boundaries.

Costs of Producing Milk, 1975-84

Carolyn Betts *

INTRODUCTION

The Economic Research Service (ERS), U.S. Department of Agriculture (USDA), began estimating average costs of producing selected major agricultural commodities, including milk, in 1974, as directed by the Agriculture and Consumer Protection Act of 1973. Since then, ERS has used a variety of procedures, methodologies, and formats to estimate costs of producing milk. In 1983, ERS began publishing annual cost-of-production (COP) estimates, back to 1981, as a separate bulletin within the Economic Indicators of the Farm Sector series, using a further revised cost-and-return budget format (16). 1/ Estimates of cost-and-return budgets allow shortrun and longrun financial comparisons among regions and commodities. The budgets also provide more detailed, accurate estimates of certain cost items from new survey data and changes in legislation authorizing the COP program, allowing flexibility in procedures for estimating costs.

This report reconciles the methodological and format changes in COP milk estimates over the past 10 years. Besides basic format changes, data sources have changed, new data have become available, and methodologies have been improved. The 1975-80 cost estimates were adjusted to conform to the current format, concepts, and methodology, resulting in a 10-year cost-and-return series that provides consistent COP estimates over time.

This report compares old and new procedures by describing methodological and format changes in the accounts, describes procedures for re-estimating budgets for 1975-80, and presents budgets for 1975-84.

STRUCTURE AND PROCEDURES OF THE OLD AND NEW ACCOUNTS

The methodology and format for reporting the costs of producing milk have changed significantly since 1974 (8, 9, 10, 11, 12, 16). The data source for the 1974-78 estimates was the 1974 Milk Production Survey conducted in early 1975. In 1980, USDA conducted another COP milk survey of dairy farmers and

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1/ Underscored numbers in parentheses refer to items listed in the References.

obtained new information on structure and costs and returns based on their 1979 dairy operations. The COP surveys for the various commodities were conducted independent of the annual Farm Production Expenditure Survey (FPES), which obtained whole farm (all enterprises aggregated) expenditure data. Since 1984, the FPES and COP surveys have been merged into one survey instrument, the Farm Costs and Returns Survey (FCRS), where the whole farm expenditure data is collected annually and the enterprise COP data is collected on a rotating basis (for example, milk, beef, hog, and potato production data will be collected with the 1985 FCRS). The surveys provide the base data for production practices, quantities of inputs and yields, and costs on items not available from secondary sources, while prices are taken from secondary sources where available. The milk costs of production from 1974-78 were reported for 24 U.S. subregions. The regional boundaries split many States into two, three, and in two cases, four regions. In 1979, ERS redefined the regions to include only whole States, facilitating the use of secondary data, which are reported on a per-State basis.

The data published in Economic Indicators of the Farm Sector: Costs of Production, 1982 marked a major change in both format and methodology for estimating many cost items (16). Budgets since 1980 include estimates of overall crop and livestock returns based on harvest-month prices for crops and yearly average prices for livestock, enterprise cash costs and returns, and economic costs and returns to owned inputs. Many cost and cashflow estimates and additional information on input costs were added to each budget to provide comprehensive commodity cost information.

New Methods and Format

Table 1 shows the different formats used in reporting milk production costs since 1975. Methodology changed for specific items between 1976 and 1977 as well as when the format changed. No cash receipts were reported from 1975-78; however, income from the sale of cull cows and calves was included in 1977 and 1978 as an adjustment to total costs. The old format contained an estimate of variable costs and costs imputed to operator-supplied inputs: machinery, overhead, management, and land (6, 9, 10, 11, 12). The current format contains three major categories of revised cost-and-return measures: cash receipts, cash costs (including variable and fixed expenses), and economic costs (which itemize allocated returns to owned inputs). The format and methodological changes are apparent in table 1 comparisons:

- o Receipts, returns, and economic costs are included in the new format.
- o Variable cost items are the same as in the old format but with greater detail in the later formats (that is, beginning in 1979, the formats itemize expenses for milk marketing, dairy supplies, fees for the Dairy Herd Improvement Association (DHIA), and livestock hauling).
- o General farm overhead in the new format reflects actual cash expenses and is estimated from the FCRS, which presents dollars of expenses for overhead items per dollar of sales. Taxes under the new format include real estate taxes. Interest expenses are also estimated from the FCRS, which provides actual interest costs as a percentage of total receipts. In previous budgets, an average interest cost was assigned to all producers based on the amount and timing of input purchases; however, this method failed to reflect actual interest costs.

Table 1--Format differences in milk cost of production reports

1975-78	1979-80	1981-84
	Gross revenue:	Cash receipts:
Cost adjustment for income from cull cows and calves:	Milk	Milk
	Cull cows, calves, and replacements	Cull cows, calves, and replacements
Direct costs:	Direct costs:	Cash costs:
Feed	Feed	Feed
Milk hauling	Milk hauling	Milk hauling
Artificial insemination	Artificial insemination	Artificial insemination
Veterinary and medicine	Veterinary and medicine	Veterinary and medicine
Fuels and electricity	Fuels and electricity	Fuels, lube, and electricity
Machinery and equipment repairs	Machinery and equipment repairs	Machinery and building repairs
Hired labor	Hired labor	Hired labor
Interest on operating capital	Interest on operating capital	
Overhead	Overhead	
Miscellaneous	Milk marketing	Milk marketing
	Dairy supplies	Dairy supplies
	DHIA fees	DHIA fees
	Livestock hauling	Livestock hauling
		Dairy assessment
		Fixed expenses:
		General farm overhead
		Taxes and insurance
		Interest
Ownership costs RITI: <u>1/</u>	Ownership costs RITI: <u>1/</u>	Capital replacement
Machinery	Machinery	
Buildings and equipment	Buildings and equipment	
Livestock	Livestock	
		Economic costs:
		Variable expenses
		General farm overhead
		Taxes and insurance
		Capital replacement
	Returns to producer:	Returns to owned inputs:
	Operator labor	Operating capital
	Management	Nonland capital
Land allocation		Land
Operator and family labor		Unpaid labor
Management		Residual to management

1/ RITI = Replacement, insurance, taxes, and interest charges.

- o The new format identifies the capital replacement cost, representing a charge sufficient to maintain the machinery and livestock investment and production capacity through time. The old format included the same replacement charge as part of the aggregated total ownership costs.
- o Management costs before 1979 were defined as 7 percent of the total costs to comply with the Agriculture and Consumer Protection Act of 1973. This type of fixed charge did not necessarily reflect how producers determined their return to management and risk because management is usually rewarded residually. In addition, management is not commonly separated from farm operator labor, and there are no standard fee schedules upon which to base this charge. The 1981 farm act provided flexibility in choosing the appropriate allocation for management. Therefore, the new format calculates the return to management and risk as a residual by subtracting the total economic costs from the total cash receipts.
- o The economic costs section of the new format allocates returns to the factors of production. In addition, the variable costs, general farm overhead, taxes and insurance, and capital replacement (all of which are also listed in the cash costs section) are included. The cash interest expenses are excluded; thus, total receipts minus economic costs yield a return that can be used to compare total costs and returns without regard for equity levels or tenure of producers.

Cash Receipts

The cost-and-return budget now includes cash receipts, which measure gross production value, permitting estimation of cash flows, residual returns to management and risk, and returns to owned resources used in production. These residual returns fluctuate as prices and yields change and provide information to measure the economic performance of a commodity in a particular year and over time. The current budget reports income from the sale of milk and cull cows, bull calves, and replacements. It includes revenues for both milk and meat sales because, although revenues are easily identified, production costs are extremely difficult, if not impossible, to separate. Thus, the procedure does not distinguish between production costs of milk and production costs of meat, thereby avoiding explicit allocations of joint production costs while not ignoring them. This procedure allows evaluation of the dairy enterprise versus production of the single product, milk.

The old COP budgets reported no cash receipts, as such. However, the 1975 and 1976 sales value of cull cows and calves (based on 1974 survey data and the appropriate year's current prices) was converted into the hundredweight (cwt) of milk equal in value and added to the cwt divisor used in calculating costs per cwt of milk. This procedure implied that production of milk and cull cows and calves each contributed to the combined total cost and individual resource costs in proportion to its relative contribution to gross sales receipts. Including milk equivalents of meat values in the cwt divisor lowered costs per cwt of milk compared with costs per cwt obtained by using procedures from later reports. In 1977 and 1978, income from the sale of cull cows and calves was shown as a downward adjustment to total costs, resulting in a total net cost figure, which did not imply a specific (proportional to receipts) allocation of total costs to milk and meat. The value of cull cows and calves was shown as a credit assuming that their production was invariably a

breakeven aspect of the dairy farm operation (2). The 1979 and 1980 reports included cash receipts as they are currently reported.

Changes in the method of accounting for byproducts reflects a continuing search for the primary purpose of cost of production estimates. Earlier studies focused on a single product, milk. Later procedures focused on an enterprise, dairy.

Cash Expenses

Cash expenses are out-of-pocket costs incurred during production. Cash expenses per cwt of milk reflect the minimum breakeven price needed to produce milk in the short run at a given level of milk production per cow. Subtracting cash costs from production value (cash receipts) leaves net cash income before replacement of depreciable assets. Excluding income taxes from this amount leaves the discretionary income that can be used for debt retirement, family living expenses, depreciable asset replacement, or other investments (4). This "cashflow" measure includes interest payments but does not account for principal payments, which will depend on the farmer's equity. Data for estimating cash expenses come from the milk production survey, price reports from NASS (National Agricultural Statistics Service, formerly the Statistical Reporting Service), and the budget generator, a set of computer routines that generate enterprise budgets from input price and quantity data. Cash returns are calculated both before and after the charge for the replacement of capital invested in machinery, equipment, livestock, and buildings. In any given year, an operator may defer the purchase of any of these items, depending on the income or tax position of the farm. However, over the long run, operators must set aside funds to replace equipment, machinery, livestock, and buildings. Thus, the residual cash available for family living, debt retirement, or other discretionary uses should reflect economic depreciation of these capital items. Actual interest paid, an additional cost item contained in the new accounts, is estimated from FCRS data.

Variable Cash Expenses. The current format includes costs for silage, hay, haylage, and pasture and other forages. Forages are valued as a weighted average price, reflecting variable production costs for raised forages and market prices for purchased forages. The amounts raised and purchased are taken from the 1979 survey data. Various fixed costs associated with homegrown forage production (crop machinery and land costs) are included in the appropriate items, such as taxes and insurance, capital replacement, and returns to operating capital, nonland capital, and land. Costs for unpaid crop labor are included in the allocated returns to unpaid labor cost.

Costs for silage, hay, and pasture and miscellaneous forages were included in the 1975-78 COP reports. (Note that haylage was not included as a separate item.) However, these costs were valued at market prices received by farmers. Forage prices were taken from the 1974 Milk Production Survey data and updated annually according to changes in the reported hay price. This procedure was based on the theory that the dairy enterprise pays its own way; that is, other enterprises should not supplement it to make it profitable. This method did not accurately reflect costs facing the average dairy farmer who raises some portion of the forages and incurs some fixed costs as a result.

The 1979 and 1980 COP reports also included costs for corn silage, hay, haylage, and pasture and other forages. They were valued by a weighted

average price that reflected total (variable and fixed) production costs for raised forages and market prices for purchased forages. This method also inaccurately reflected the cost structure of dairy farmers by including fixed costs, such as machinery ownership and land costs, associated with crop production in the price. These fixed costs consequently appeared as variable costs.

The concentrates category in the current format includes all grains and concentrates. The reported annual average feed value per cwt of milk for grains and concentrates is multiplied by the weighted average production per cow. Production per cow is based on the 1979 survey data and indexed according to changes in reported milk production (21). The annual amount of feed fed to dairy replacement stock is taken from the survey data and valued at the current reported values for grain and concentrates. Total concentrate expenses include expenses for feed fed to dairy replacement stock.

The current procedures annually update the 1979 survey data for other cash expenses based on changes in the following NASS price data (14). Artificial insemination expenses are based on 20 percent of changes in the prices paid index for fuels and energy, 30 percent of changes in the prices paid index for autos and trucks, and 50 percent of changes in the wage rate index. Veterinary and medicine expenses are based on 30 percent of changes in the prices paid index for agricultural chemicals and 70 percent of changes in the wage rate index. Hired labor expenses are calculated by multiplying the labor hours from the 1979 survey by the reported farm labor wage rate for the appropriate year and then adding the employer's share of social security. Dairy supplies expenses are based on changes in the prices paid index for items used for production. The DHIA fees expense is based on 20 percent of changes in the prices paid index for fuels and energy, 30 percent of changes in the prices paid index for autos and trucks, and 50 percent of changes in the wage rate index. Livestock hauling expenses are based on 30 percent of changes in the prices paid index for fuels and energy, and 70 percent of changes in the prices paid index for farm and motor supplies.

Milk hauling and milk marketing expenses are updated from the survey data by indexing according to the annual percentage change in the respective charges as reported by administrators of the Federal Milk Marketing Order.

Fuel, lube, and electricity expenses and machinery and building repair expenses are calculated by the budget generator, which uses the survey data and updated prices. Fuel, lube, and electricity expenses are calculated by multiplying the hours each item is operated by the power consumption rate per hour and appropriate fuel prices. Machinery and building repairs expenses are estimated in relation to the average age and current list price of the machinery and buildings.

The 1975-78 COP reports also determined other cash costs by an indexing procedure and used the budget generator with the current formulas. However, many of the prior indexing calculations used different ratios and indexes than now used. The procedures used in 1979 and 1980 are the same as under the current methodology.

Fixed Cash Expenses. The fixed costs category includes general farm overhead expenses, which are computed as a percentage of milk receipts based on FCRS data. Overhead expenses represent actual cash expenses for electricity for general farm use, fees and dues, fence materials and supplies, farm

telephones, farm water (not irrigation), water drainage, liability insurance, and general business. Overhead expenses in the 1975 and 1976 reports were calculated as 3 percent of the total variable costs. The procedure was revised in 1977 and overhead expenses were taken from the 1974 survey and updated by using the Consumer Price Index (CPI) for all items less food. Overhead expenses in 1979 and 1980 were computed as a percentage of milk receipts. The percentage was based on the annual FPES for farms with 70 percent or more of their income from milk sales and was updated by using the CPI for all items less food.

Tax expenses are based on the current value of new machinery, equipment, and buildings lagged to a base year. Lags are based on the average age of equipment and buildings from the 1979 Milk Production Survey. Taxes include personal property taxes on machinery and real estate taxes. Insurance is computed on the current values of machinery, equipment, buildings, and livestock. Tax and insurance expenses for machinery and land used in forage production for the dairy enterprise is also included.

The 1975-80 budgets included tax and insurance costs with total ownership (RITI) costs but did not include them for forage crop production for the dairy enterprise. 2/

Interest expenses are calculated as a percentage of total receipts, which is taken from the annual FCRS and reflects real estate and nonland loan rates. Again, the 1975-80 COP budgets included interest costs associated with machinery, equipment, buildings, and livestock, with total ownership costs as computed with budget generator formulas.

Capital replacement charges are estimated on the current value of machinery, equipment, buildings, and purchased breeding stock by using budget generator computations. Replacement reserve charges were calculated in the same manner for the 1975-80 reports but were included in total ownership costs and not as a separate item.

Economic Costs

The economic costs section is a new feature of the budget and attempts to place a value on inputs and resources required to produce the current year's production regardless of ownership. For example, the cash expenses of two dairy farmers may differ because of differing levels of debt, even if they have the same level of management ability and use identical practices and technology in similarly productive herds. The economic costs and returns section provides a framework for analyzing these diverse situations. The total economic costs per cwt of milk show the breakeven, longrun average price necessary to continue producing milk.

Economic costs are the sum of variable expenses, general farm overhead, taxes and insurance, and capital replacement charges. Interest is excluded because it implies a certain equity position. The total is subtracted from cash receipts, and the resulting residual return can be allocated to cover costs of land, machinery, unpaid labor, and capital for operating inputs. The cost allocation in the new format is based only on the imputed economic value of each item that is directly attributed to the production process.

2/ RITI = Replacement, insurance, taxes, and interest charges.

The new format's methodological procedure for allocating residual revenues to each asset uses the annual rate of return the producer could expect land, labor, and capital to earn in the current year. The return to management and risk, the residual amount after these deductions have been made, can be evaluated only in light of the given allocation of residual returns. If differing allocation procedures are used, the returns to management and risk are not directly comparable unless the same procedure is used for each commodity.

The value of owner-supplied input earnings is often difficult to determine. One cannot easily assess the additional revenue earned when a producer invests more money in operating inputs rather than incurring additional short-term debt. The 1975-80 COP budgets used the value of the variable inputs in the dairy enterprise's inventory to determine the opportunity cost of operating capital. The average time that feed and other items were in the dairy enterprise's inventory was set at 3 months and used for the length of time the value of inventory is subject to the interest rate of the local Production Credit Association (PCA). This interest rate was described as "interest on operating capital," and considered a cash cost. Accounts in the current procedure calculate the value of operating capital by assuming that the rational producer expects money invested in variable production inputs to earn at least as much as if the money were placed in a savings account or a similar financial instrument. Thus, the latter, relatively risk-free rate of return, which is the opportunity cost of these funds, is the average 6-month U.S. Treasury bill (T-bill) rate.

The annual expected return the average producer might receive from capital invested in the nonland assets used in production is estimated directly from income and balance sheet data published in (15). A single real rate of return is estimated by taking a 20-year moving average of the ratio of residual income to assets for the farming sector. The rate is the average of the previous 20-year total return to production assets in the agricultural sector, less the yearly value of operator labor, divided by the respective value of the assets. This average rate of annual earnings of owner-supplied or owned assets for all commodities in all regions is a good proxy of the past and expected returns of farm assets. Data are not available to estimate rates of return specific to various commodities and regions. Therefore, the cost of capital invested in nonland factors of production is calculated by multiplying the total value of machinery, equipment, and breeding livestock by this rate of return to all production assets. The value of machinery, buildings, and equipment are lagged from current prices according to their average age to reflect their initial prices. The average age for equipment and permanent structures for each State is taken from the 1979 Milk Production Survey. Livestock is valued at the current year's value.

The 1975-80 estimates included charges for capital invested in machinery, buildings, equipment, and livestock as the interest expense of RITI costs. The PCA rate was applied to each item's lagged value (that is, buildings were lagged 15 years; machinery, 4 years; equipment, 2 years; and livestock, current year). However, engineering data were applied uniformly to all regions. Therefore, the actual age of machinery, buildings, and equipment in each region was not necessarily reflected, possibly distorting the interest charge for invested capital.

Returns to land are calculated by the same procedure as nonland capital, using the average 20-year rate of return and the average current value of land and

including acreage used in homegrown forage production. Land values are taken from 1979 survey data and updated according to changes in value indices for State farm real estate. Taxes are not included here as they are in tax and insurance expenses.

COP reports for 1975-78 included "land allocation" that included land taxes and interest (Federal Land Bank (FLB) interest rate) on the land's current market value for agricultural purposes. Only the dairy farmstead and pasture acreage were included. Land values from the 1974 survey were indexed by State data to reflect the appropriate value. Land was not an itemized cost in 1979 and 1980; the cost for acreage in forage production was based on a cash rent charge and was included in the forage costs in the direct costs section.

The Agriculture and Food Act of 1981 modified the valuation criteria for land and nonland assets. The observed average historical return to fixed factors in agricultural production overcomes some of the shortcomings of using the PCA and FLB rates. Nominal interest rates used from 1975-80 reflect asset appreciation, while future returns to assets (for example, realized after-tax capital appreciation of assets) are excluded. Thus the average historical return more closely reflects only the contribution of land and nonland assets to the current year's production. Also, FLB and PCA interest rates may not be accurate representations of opportunity costs to the dairy enterprise unless all capital is borrowed (4).

The value of the time that operators and other individuals work in the dairy enterprise without pay is included as an allocated cost and is a good estimate of earnings the laborer could expect to receive if employed elsewhere. Hours are based on 1979 survey data, are valued at the equivalent of the hired wage rate, and include the employer's share of social security charges. The value of unpaid labor used in forage production for the dairy enterprise is included also. The 1975-80 unpaid labor was valued similarly but was based on different data and did not include homegrown forage production labor.

Additional returns, reflecting the operator's entrepreneurial skill, is included in residual returns to management and risk. These returns are calculated by subtracting the total economic costs from the total cash receipts. In 1975-78, management was computed at a fixed rate, 7 percent of total costs as mandated by Congress, an unsatisfactory method because management is not typically rewarded at a set rate.

Procedures for Making Old and New Estimates Consistent

Milk production costs in the 1975-78 COP reports are not comparable with costs in current COP reports due to differing regional boundaries, methodology, and cost estimation procedures. Therefore, in this report, all regional and U.S. COP figures for 1975-78 are based on the 1979 Milk Production Survey and have been revised using current methodology. The 1979-80 COP figures are revised for those items where the methodology had changed (that is, forage expenses, fixed expenses, capital replacement, and allocated returns to owned input). In addition, the 1981 figures for general farm overhead and interest are revised. Thus, the resulting budgets and costs and returns information can be compared from 1975 through 1984 because all the COP estimates are based on the same assumptions, procedures, and basic technical data--the 1979 Milk Production Survey.

Periodic surveys enable the tracking of changes in technology, production practices, and industry structure. This report bases all calculations on 1979 survey data because the 1974 survey used different sampling procedures and sampled a different set of States than did the 1979 survey. Future surveys probably will be conducted and tabulated on a more comparable basis so that technical changes in dairying can be clearly evident.

Milk production per cow is indexed from the 1979 survey data according to changes in the amount of milk produced per cow by State as reported by NASS (21). The reported changes are weighted according to annual average cow numbers in each State in the respective region and in the United States. These adjusted milk production figures are used to determine the milk receipts, concentrate feeding levels, and the milk marketing and hauling charges. The costs per cwt of milk use this adjusted average milk production as the divisor.

Cash Receipts

Cash receipts were included in the 1979 and 1980 reports as they are now. However, the 1975-78 COP figures did not include cash receipts; therefore, they are estimated for those years. Milk receipts are calculated by multiplying adjusted milk production by the all-milk price per cwt. The price per cwt is the average annual price received for milk sold to plants and dealers by producers as reported for each State by the NASS (21), weighted by cow numbers in the selected States into regional and U.S. average milk prices. The amount of milk sold is based on the 1979 survey and adjusted annually according to changes in average State milk production per cow as reported by NASS (21).

The quantity of cull cows, calves, and replacements sold is taken from the 1979 Milk Production Survey expressed as percentages of total milk cow numbers, and calculated based on the respective year's current reported number of dairy cattle. Prices per cwt and per head are those reported for each State by the NASS (19) and are aggregated into regional prices based on milk cow numbers.

Cash Expenses

This section presents procedures for making the old variable and fixed cash expenses consistent with the new expenses.

Variable Cash Expenses. Forage costs for 1975-80 are re-estimated because earlier reports used different data, assumptions, and procedures. Therefore, all forages (silage, hay, haylage, pasture, and other) are indexed from 1981 according to changes in the reported all-hay price for 1975-80. Concentrate costs for 1975-78 also are re-estimated because earlier reports used different data, assumptions, and procedures. Grain and concentrates fed to milking cows and replacement stock are included in the concentrate expense. The annual average feed value per cwt of milk for grains and concentrates as reported by State is aggregated into regional and U.S. average values per cwt of milk and multiplied by the respective region's adjusted milk production. The cost of concentrates fed to replacement stock is added to this figure. The annual amount of feed fed to replacement stock is taken from the survey data and valued at the regionally aggregated cost per cwt of grain and concentrates as reported for each State by NASS (21). The 1979 and 1980 COP reports were consistent with the current methodology for the concentrate expense; therefore, the concentrate expense figures for these years are not changed.

Other cash expenses for 1975-78 are re-estimated because earlier reports used different data and procedures. The 1979 and 1980 COP reports were consistent with the current methodology for other cash expenses; therefore, these figures are not changed. Other cash expenses (milk hauling, artificial insemination, veterinary and medicine, livestock hauling, milk marketing, hired labor, DHIA fees, dairy supplies) are indexed back from 1979 for the 1975-78 figures by the same indices used in the current updating procedures.

Fuel, lube, and electricity expenses are indexed back from 1979 by the prices paid index for fuels and energy, while machinery and building repairs expenses are indexed by the prices paid index for farm and motor supplies. These are indexed because the budget generator, currently used to determine these expenses, cannot be reprogrammed easily to previous years' data for computing that year's expenses.

Fixed Cash Expenses. General farm overhead (GFO) is expressed as a percentage of total receipts based on FCRS data, which are unavailable for 1975-80. Therefore, GFO is calculated for 1975-80 as a percentage of total receipts, using the GFO's 3-year average percentage of total receipts for 1982-84 for each region and the United States. The resulting figures are indexed according to changes in the prices paid index for production items of nonfarm origin.

Taxes and insurance expenses in the 1975-80 COP reports did not include real estate taxes and were lumped under total ownership costs along with interest and replacement reserves. Accurately breaking out itemized costs, computing the real estate tax cost, and reaggregating them into the current regions is not possible. Thus, tax and insurance expenses for 1975-80 are calculated by multiplying the tax and insurance expenses percentage of capital replacement in 1981 by the respective year's capital replacement figure and indexing from 1981 according to the taxes paid index.

The current methodology uses FCRS data to estimate actual dollars of interest paid per dollar of receipts. Interest data are separated into two categories: interest on loans secured by real estate and all other interest. FPES data were unavailable before 1980. The percentage distribution of the two interest items from 1982-84 data consequently is used to impute interest costs for 1975-80, using changes in FLB and PCA rates. The 1981 figures were also re-estimated because 1981 FCRS interest data were revised. Interest expenses for 1975-81 are calculated by taking the average percentage that interest is of gross receipts for 1982-84 by region and the United States, and indexing back from 1982 by changes in interest rates. FLB and PCA interest rates are used to represent long-term and short-term interest rates, respectively. The proportions of the interest expense from long-term and short-term debt are determined for each region from current FCRS data.

Capital replacement charges in the 1975-80 COP figures are lumped under total ownership costs along with interest, taxes, and insurance. Accurately breaking out these charges is not possible, however, even though they were calculated in the same way. Therefore, the charges are estimated for 1975-80 based on changes in the dairy cow price (aggregated from reported State prices into regional and U.S. prices) and the prices paid indices for building and fencing materials, tractors and machinery, and machinery and implements, respectively representing livestock, buildings, machinery, and equipment. The weight that each of these factors was given in the index is calculated for each region and the United States based on the percentage of the total capital

replacement figure that is represented by each of these items with current methodology.

Economic Costs

The allocated returns to operating capital for 1975-80 is indexed from 1981 by changes in the 6-month T-bill rate.

The allocated returns to nonland capital for 1975-80 is calculated by multiplying the percentage of capital replacement that represents nonland capital in 1981 by the respective year's capital replacement figure and indexing from 1981 according to changes in the 20-year average rate of return to productive assets.

The allocated returns to land for 1975-80 are calculated by indexing back from the 1981 reported land value according to changes in the index for farm real estate value per acre (1) and multiplying by the appropriate 20-year average rate of return to production assets.

The allocated returns to unpaid labor for 1975-80 are indexed from 1981 according to changes in the wage rate index.

MILK PRODUCTION COSTS AND RETURNS, 1975-84

Appendix tables 1-14 show estimated regional and U.S. costs and returns of milk production for 1975-84. Costs and returns varied widely between regions due to differences in yield, mix of production inputs, and prices.

U.S. costs of producing milk since 1975 increased steadily, except for the 14-cent-per-cwt drop in 1982, due mostly to lower concentrate feed costs that year. Costs per cwt peaked in 1984 for the 1975-84 period at \$13.57, 53 percent higher than in 1975. This figure included all cash expenses (except for interest expenses); capital replacement; and allocated returns to labor, operating capital, nonland capital, and land. The figure represented the longrun breakeven average revenue needed to continue milk production (figure 1).

Variable cash costs per cwt of milk increased 39 percent, while fixed cash costs more than doubled, rising from \$1.01 in 1975 to \$2.57 in 1984. Total cash costs, representing the shortrun breakeven price, increased 56 percent from \$6.81 per cwt in 1975 to \$10.64 per cwt in 1984. Major increases in prices paid in 1979 and 1980 helped escalate these costs. For example, prices paid for fuel and energy increased 31 percent in 1979 and 37 percent in 1980, while prices of grain and concentrates increased 22 percent from 1978 to 1980. Feed costs (forage and concentrate expenses) as a percentage of total cash costs per cwt of milk steadily declined from 59 percent in 1975, to 46 percent in 1984.

Increases in cash receipts for milk and meat from 1975-79 more than offset increases in costs, as residual returns to management and risk (receipts less economic costs) rose from 36 cents per cwt in 1975 to a peak of \$2.06 per cwt in 1979. An 11-percent increase in costs per cwt of milk accompanied a 7-percent rise in revenue; thus, residual returns fell to \$1.69. Average prices received for milk peaked in 1981 at \$13.69 per cwt. However, cash receipts declined since 1981; thus residual returns also declined. Residual

returns for 1984 reached their lowest level since 1975 at 88 cents per cwt. This translated into a return to management and risk of \$126.78 per cow in 1984, down \$136.89 from 1979 but up \$87.72 from 1975.

The Pacific region had the lowest costs every year during 1975-84, remaining more than \$1 per cwt lower than any other region and averaging \$1.62 per cwt below U.S. average costs for the 10-year period. The Pacific's low fixed costs and relatively high milk production per cow were the major factors in the low-cost level. In addition, the Pacific's costs rose \$3.87 from \$7.57 per cwt in 1975 to \$11.44 per cwt in 1984, the smallest increase of all the regions. The average percentage increase in costs for all regions during 1975-84 was 53 percent, or \$4.70 per cwt.

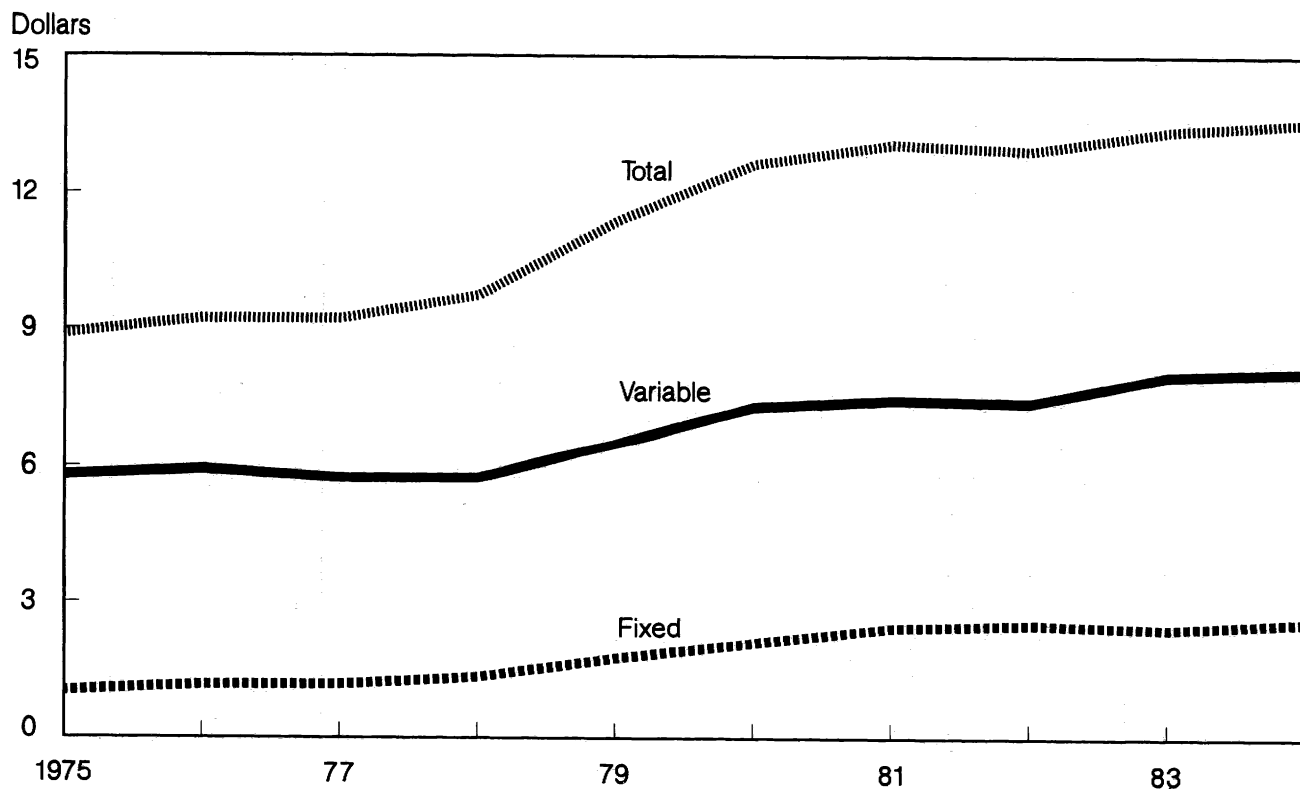
Total costs of producing milk in the Northeast, Southern Plains, and Upper Midwest fluctuated within 48 cents per cwt of each other (except in 1981 when the Upper Midwest was 92 cents per cwt below the Southern Plains) and averaged 63 cents per cwt below Appalachia and the Corn Belt over the 10-year period.

Appalachia and the Corn Belt had the highest costs for 1975-84. The Corn Belt's costs per cwt increased \$5.36, 14 percent above the U.S. average increase for 1975-84 and the largest increase of any of the regions.

The Southern Plains consistently received the highest cash receipts for milk and meat from 1975-84. Cash receipts in the Upper Midwest, however, increased the most at \$5.53 per cwt (5.9 percent above the U.S. average increase), while those in the Pacific increased the least at \$4.05 per cwt (22.4 percent below the U.S. average increase).

Figure 1

Costs of Producing Milk



The Pacific maintained the highest residual return to management and risk for 8 years out of the 10-year period. Returns in the Southern Plains in 1978 were 3 cents per cwt greater than in the Pacific and 55 cents per cwt greater than in 1979. The Pacific's returns to risk and management were their lowest in 1975 at \$2.09 per cwt and their highest in 1981 at \$3.29 per cwt. The 10-year average residual return was \$2.66 per cwt in the Pacific and \$2.15 in the Southern Plains (table 2).

Figure 2 shows 10-year average regional shortrun returns (receipts minus cash expenses and capital replacement) and the 10-year average longrun returns (receipts minus economic costs) per cwt for 1975-84 expressed as a percentage of the U.S. 10-year average. Appalachia and the Corn Belt clearly show the lowest 10-year average returns.

Figure 3 shows regional and U.S. changes in costs and cash receipts. In the Upper Midwest, cash receipts increased 63 percent in 1975-84, while total costs increased 51 percent. Thus, the Upper Midwest had the largest increase in residual returns to management and risk at 96 cents per cwt. In all regions except the Northeast, receipts increased by a larger amount per cwt than did total costs. The change in the Northeast's receipts equaled the change in total costs.

Although receipts and costs increased in all regions, the magnitude of these increases differed. Costs and returns for the Pacific region increased by a smaller percentage than for other regions, while those for the Corn Belt increased by a larger percentage.

Figure 4 shows the possible relationship between the change in milk production for 1975-84 and the 10-year average returns. Total milk produced in the States surveyed increased 19.1 percent during 1975-84 (table 3), partly due to favorable returns to management and risk, which averaged \$1.39 per cwt over the 10-year period. In addition, net cash returns also remained positive in 1975-84, averaging \$2.82 per cwt for the 10 years (table 2). The Pacific region had the largest percentage increase in pounds of milk produced at 42.3 percent over the 10-year period. The Corn Belt, on the other hand, having the lowest 10-year average residual return of 12 cents per cwt, showed the smallest increase in pounds of milk produced at 1 percent over the 10-year period. This small increase may reflect the milk production response to the longrun cost structure of the different regions. In addition, the Upper Midwest, which had the second highest 10-year average net cash returns, increased its milk production 20.9 percent, the second largest increase (tables 2 and 3).

Figure 5 shows the regional percentage change in milk production, against the respective region's 10-year average economic cost. Figure 6 shows the share of U.S. milk production held by each region in 1975 and 1984 and the change in total cost for 1975-84 expressed as a percentage of the U.S. change in total costs. The Pacific region gained 2.4 percent of total milk production, the largest gain of all the regions, and showed the smallest increase in total costs. The Corn Belt, on the other hand, showed the largest percentage increase in costs compared with the U.S. increase and the largest decline in share of U.S. milk production, 1.4 percent. Thus, the 10-year cost-and-return time series data available as a result of this study can be used to further evaluate the underlying forces in the changing location of milk production and the structural dynamics of the dairy industry.

Table 2--Net cash and total returns from producing milk, by region

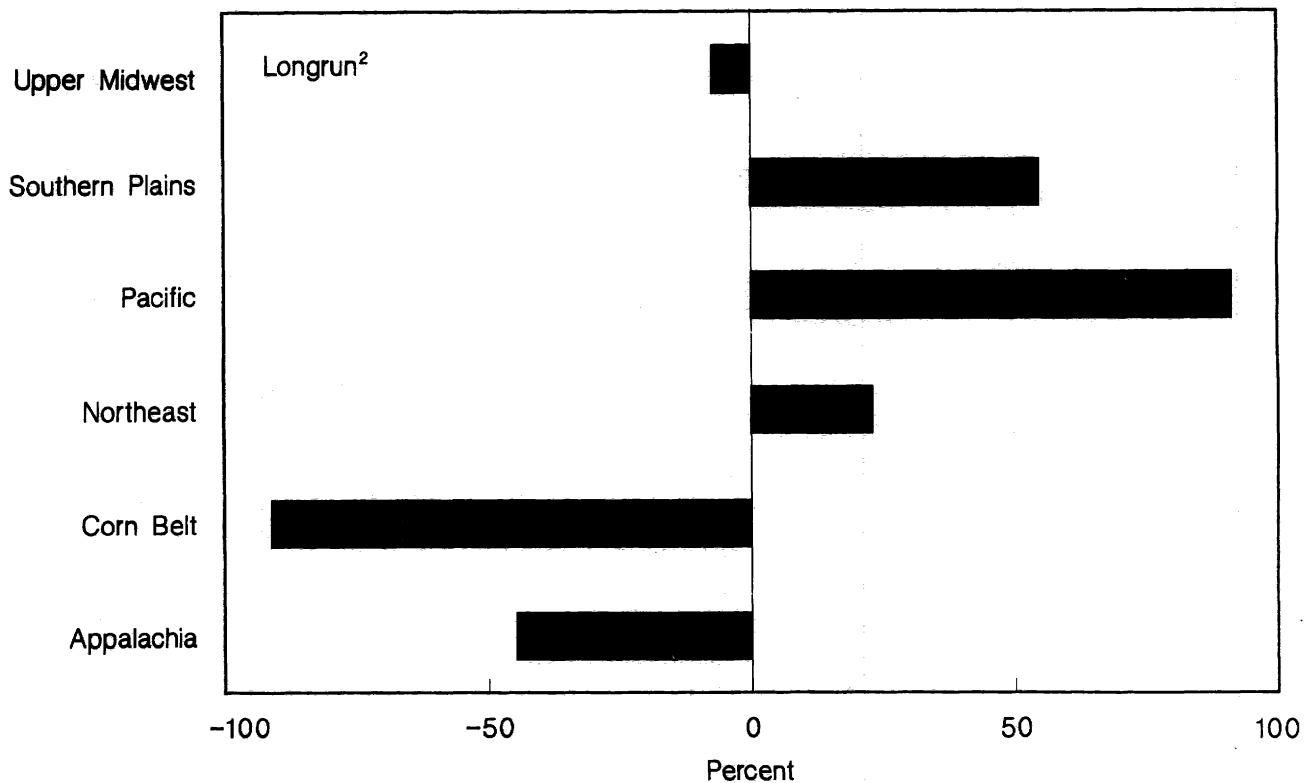
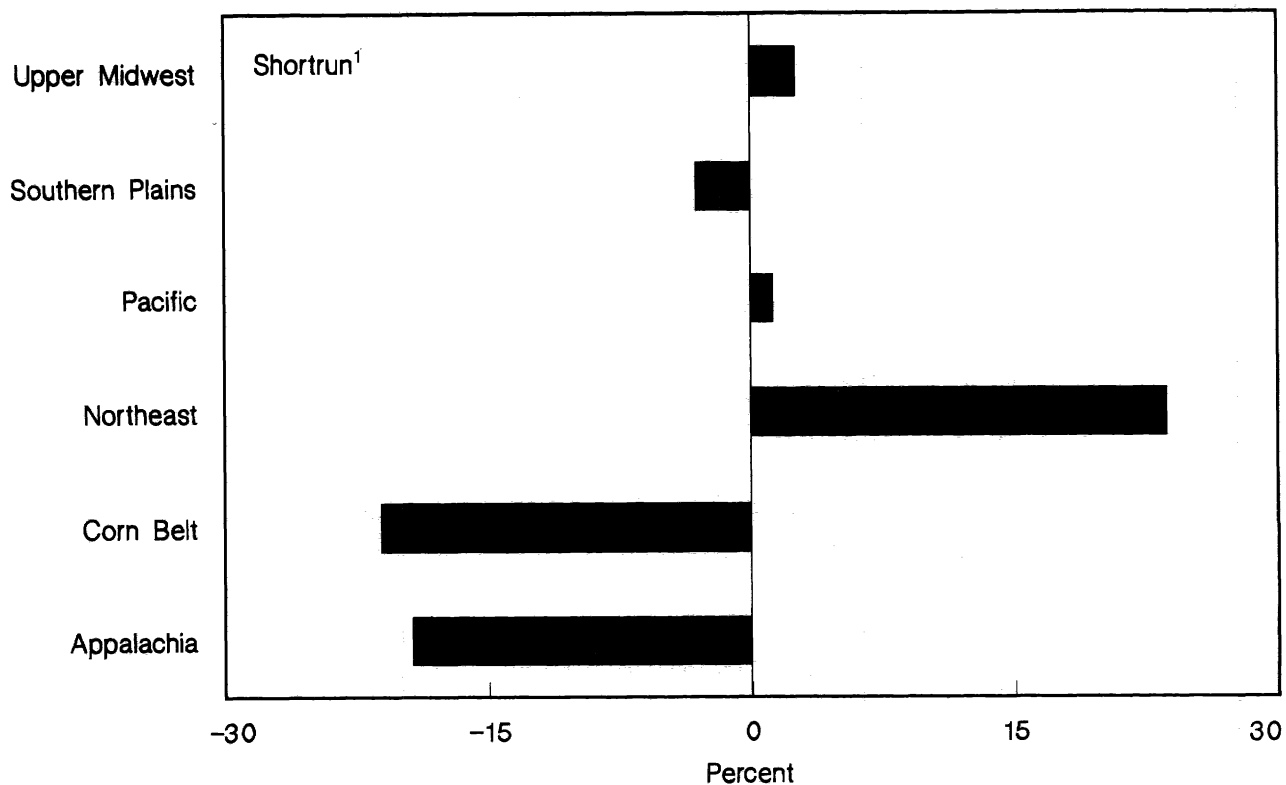
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1/ Receipts minus cash expenses and replacement.

2/ Receipts minus economic costs.

Figure 2

Average Regional Milk Production Returns as a Percentage of U.S. Average, 1975-84



1/ Receipts less cash expenses and replacement.

2/ Receipts less total economic costs.

Table 3--Milk production, by region

Region	: 1975 :1975 share:	1984 :1984 share:	1975-84 : 1975-84	: 1975-84	: change in : change in	: change in
	: pro- : of U.S. : pro- : of U.S. :change in : change in	:duction:production:duction:production:production:share of U.S.	: : : : : : : production			
	: Million	Million				
	:pounds	pounds		Percent		
United States	: 115,398	100.0	135,444	100.0	17.4	0
Appalachian	: 8,824	7.6	9,152	6.8	3.7	-0.9
Corn Belt	: 11,389	9.9	11,499	8.5	1.0	-1.4
Northeast	: 24,945	21.6	29,435	21.7	18.0	.1
Pacific	: 13,175	11.4	18,742	13.8	42.3	2.4
Southern Plains	: 3,208	2.8	3,850	2.8	20.0	.1
Upper Midwest	: 33,813	29.3	40,873	30.2	20.9	.9
Total	: 95,354	82.6	113,551	83.8	19.1	1.2

Sources: (20, 21).

Figure 3

Regional Changes in Receipts and Costs of Milk Production, 1975-84

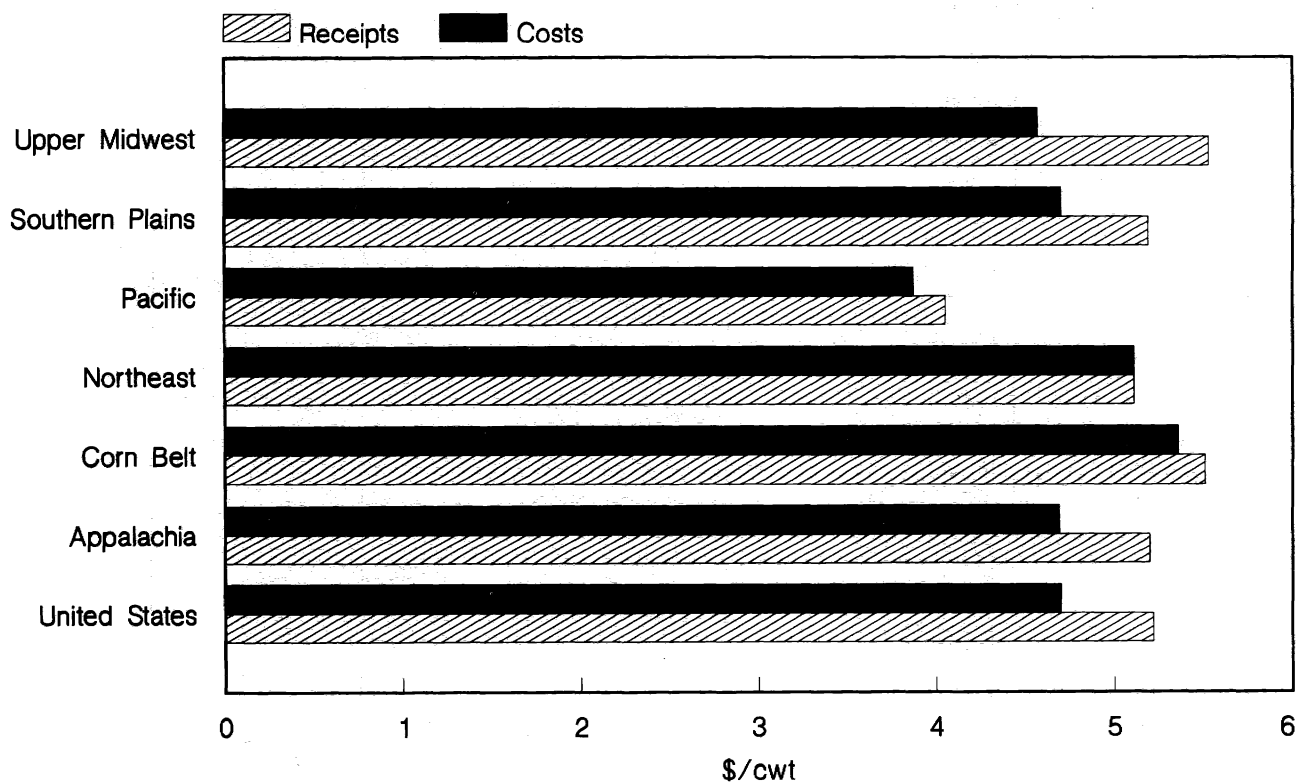


Figure 4

Relationship Between Regional Change in Milk Production and 10-Year Average Returns, 1975-84

Percentage change

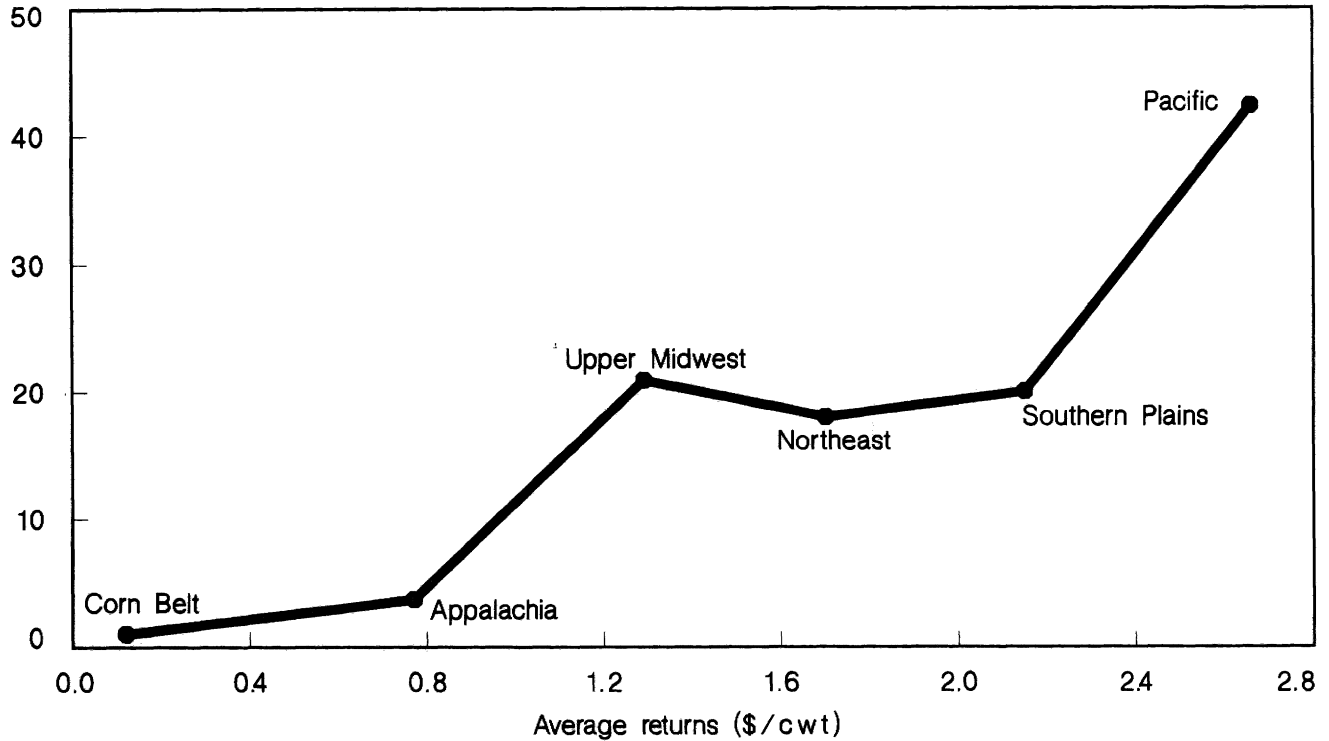


Figure 5

Regional Milk Production Changes Against 10-Year Average Costs, 1975-84

Percentage change

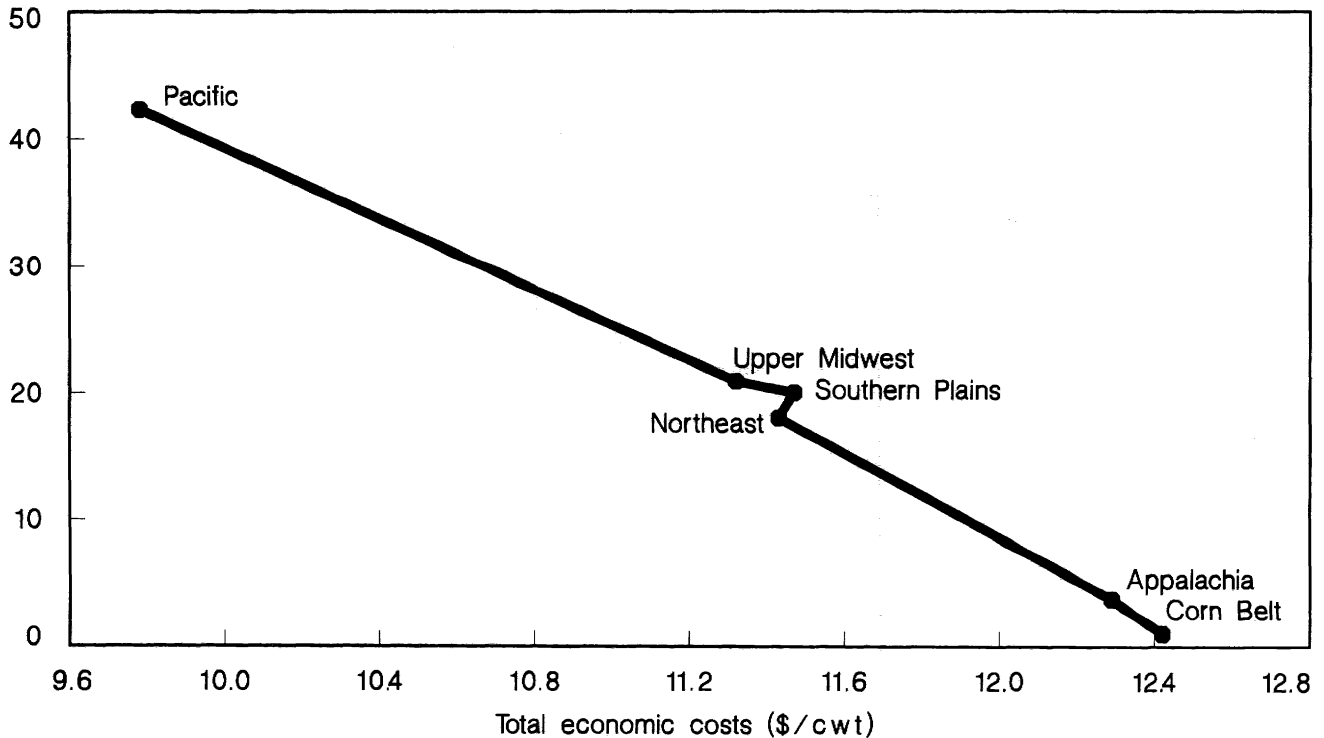
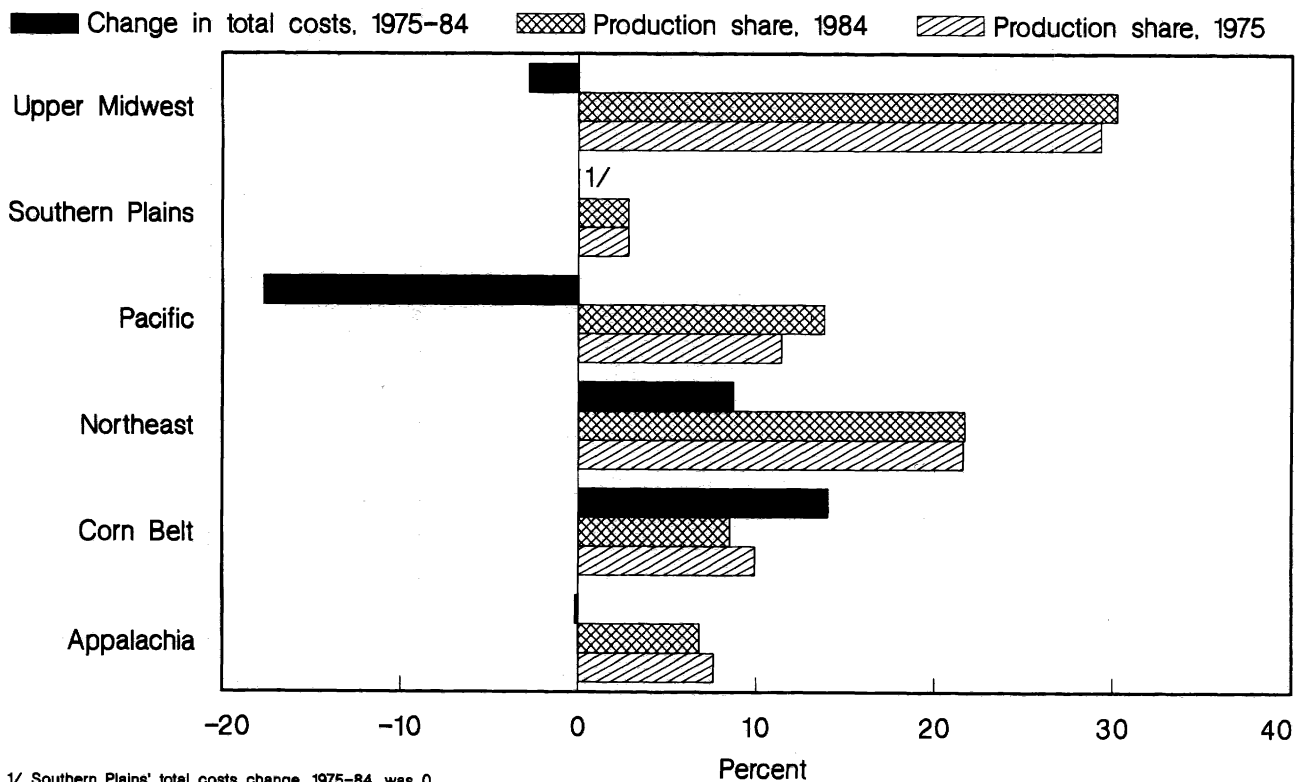


Figure 6

Regional Shares of Milk Production and Changes in Total Costs, 1975-84



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Appendix table 1—Milk production costs per cwt, United States

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
	<u>Cwt</u>									
Milk per cow	116.11	123.09	126.45	126.96	129.12	133.44	136.19	137.62	140.95	139.55
	<u>Dollars</u>									
Cash receipts:										
Milk	8.58	9.57	9.62	10.49	11.93	12.95	13.69	13.52	13.50	13.38
Cull cows, calves, and replacements:	.65	.75	.74	1.06	1.49	1.38	1.25	1.14	1.09	1.07
Total	9.23	10.32	10.36	11.55	13.42	14.33	14.94	14.66	14.59	14.45
Cash expenses	6.81	7.08	6.90	7.08	8.26	9.39	9.88	9.90	10.39	10.64
Feed--										
Silage	.30	.33	.28	.26	.31	.36	.33	.33	.33	.36
Concentrates	2.71	2.71	2.66	2.68	3.02	3.35	3.45	3.28	3.43	3.47
Hay	.73	.79	.69	.64	.74	.86	.80	.86	.85	.82
Pasture and other forages	.04	.04	.03	.03	.04	.04	.04	.04	.04	.04
Haylage	.21	.23	.20	.18	.21	.25	.23	.21	.23	.22
Other--										
Milk hauling	.23	.23	.24	.25	.29	.33	.35	.34	.34	.34
Artificial insemination fees	.07	.08	.08	.08	.09	.10	.11	.12	.12	.12
Veterinary and medicine	.16	.17	.17	.17	.18	.19	.20	.20	.21	.22
Livestock hauling	.01	.01	.01	.01	.02	.02	.02	.02	.02	.02
Marketing	.08	.08	.08	.08	.09	.10	.10	.11	.10	.11
Fuel, lube, and electricity	.19	.19	.20	.21	.27	.38	.40	.40	.37	.33
Machinery and building repairs	.30	.28	.27	.28	.30	.33	.35	.37	.37	.37
Hired labor	.60	.62	.65	.69	.74	.77	.83	.87	.85	.91
DHIA fees	.03	.03	.04	.04	.04	.04	.05	.05	.05	.05
Dairy supplies	.14	.14	.14	.15	.17	.18	.19	.19	.19	.19
Dairy assessment									.48	.50
Total, variable expense	5.80	5.93	5.74	5.75	6.51	7.30	7.45	7.39	7.98	8.07
Fixed expenses	1.01	1.15	1.16	1.33	1.75	2.09	2.43	2.51	2.41	2.57
General farm overhead	.19	.23	.24	.29	.38	.46	.54	.60	.50	.60
Taxes and insurance	.14	.16	.18	.21	.29	.34	.37	.35	.36	.34
Interest	.68	.76	.74	.83	1.08	1.29	1.52	1.56	1.55	1.63
Receipts less cash expenses	2.42	3.24	3.46	4.47	5.16	4.94	5.06	4.76	4.20	3.81
Capital replacement	.87	.92	.96	1.14	1.47	1.61	1.64	1.57	1.58	1.56
Receipts less cash expenses and replacements	1.55	2.32	2.50	3.33	3.69	3.33	3.42	3.19	2.62	2.25
Economic (full-ownership) costs:										
Variable expenses	5.80	5.93	5.74	5.75	6.51	7.30	7.45	7.39	7.98	8.07
Taxes and insurance	.14	.16	.18	.21	.29	.34	.37	.35	.36	.34
General farm overhead	.19	.23	.24	.29	.38	.46	.54	.60	.50	.60
Capital replacement	.87	.92	.96	1.14	1.47	1.61	1.64	1.57	1.58	1.56
Allocated returns to owned inputs--										
Returns to operating capital	.08	.06	.06	.09	.12	.13	.15	.12	.12	.12
Returns to other nonland capital	.54	.60	.63	.75	.97	1.08	1.10	1.04	.98	.93
Land	.19	.21	.25	.27	.30	.35	.37	.36	.37	.37
Unpaid labor	1.06	1.10	1.15	1.22	1.32	1.37	1.46	1.51	1.49	1.58
Total, economic costs	8.87	9.21	9.21	9.72	11.36	12.64	13.08	12.94	13.38	13.57
Residual returns to management and risk	.36	1.11	1.15	1.83	2.06	1.69	1.86	1.72	1.21	.88
Total, returns to owned inputs	2.23	3.08	3.24	4.16	4.77	4.62	4.94	4.75	4.17	3.88

23

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
									</	

24

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
						</				

25

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
						Cwt				
Milk per cow	106.19	121.88	125.12	124.64	126.32	131.18	133.66	136.83	136.58	132.15
						Dollars				
Cash receipts:										
Milk	968.86	1,218.28	1,256.87	1,345.31	1,550.60	1,753.77	1,889.95	1,904.53	1,905.29	1,850.74
Cull cows, calves, and replacements	61.48	75.17	75.57	113.32	162.56	151.42	136.34	129.37	127.29	121.49
Total	1,030.34	1,293.45	1,332.44	1,458.63	1,713.16	1,905.19	2,026.29	2,033.90	2,032.58	1,972.23
Cash expenses:										
Feed--										
Silage	62.20	71.73	63.98	59.34	70.78	84.60	80.19	71.12	71.30	83.87
Concentrates	352.10	398.37	412.88	427.13	482.89	567.46	594.79	560.67	598.14	584.11
Hay	70.49	81.30	72.52	67.26	80.22	95.89	90.89	90.96	100.50	89.24
Pasture and other forages	15.55	17.93	16.00	14.84	17.70	21.15	20.05	20.21	19.47	20.14
Haylage	14.51	16.74	14.93	13.85	16.51	19.74	18.71	18.63	21.10	18.72
Other--										
Milk hauling	34.16	39.25	41.16	42.76	50.75	58.79	64.16	65.49	65.24	62.64
Artificial insemination fees	8.53	9.30	10.07	10.70	12.18	13.27	14.70	16.07	16.58	17.10
Veterinary and medicine	15.34	16.76	17.03	17.56	18.85	20.36	21.39	22.79	23.74	24.44
Livestock hauling	.92	.92	.94	.98	1.14	1.41	1.34	1.62	1.56	1.52
Marketing	13.25	13.41	13.76	14.40	14.16	15.78	17.37	18.24	18.23	18.44
Fuel, lube, and electricity	22.11	23.37	25.12	26.38	34.42	50.44	56.14	54.89	51.87	43.99
Machinery and building repairs	29.71	29.13	29.13	30.30	33.50	37.39	41.43	43.51	44.37	43.88
Hired labor	92.21	100.89	108.48	116.07	126.92	135.53	149.70	145.69	155.59	158.77
DHIA fees	3.90	4.25	4.60	4.89	5.57	6.12	6.68	7.40	7.63	7.84
Dairy supplies	20.27	21.61	22.28	24.06	27.85	30.91	33.42	33.05	34.16	34.70
Dairy assessment									65.56	66.07
Total, variable expenses	755.25	844.96	852.88	870.52	993.44	1,158.84	1,210.96	1,170.34	1,295.04	1,275.47
General farm overhead	20.97	27.51	30.17	35.36	47.02	59.70	70.91	76.05	55.62	77.37
Taxes and insurance	12.74	15.21	17.46	21.12	31.01	38.34	42.77	39.68	43.45	35.42
Interest	53.40	66.65	66.83	74.05	97.14	121.08	145.43	154.85	154.68	161.33
Total, fixed expenses	87.11	109.37	114.46	130.53	175.17	219.12	259.11	270.58	253.75	274.12
Total, cash expenses	842.36	954.33	967.34	1,001.05	1,168.61	1,377.96	1,470.07	1,440.92	1,548.79	1,549.59
Receipts less cash expenses	187.98	339.12	365.10	457.58	544.55	527.23	556.22	592.98	483.79	422.64
Capital replacement	84.44	93.32	100.66	121.80	167.11	192.23	200.49	195.66	199.12	191.75
Receipts less cash expenses and replacements	103.54	245.80	264.44	335.78	377.44	335.00	355.73	397.32	284.67	230.89
Economic (full-ownership) costs:										
Variable expenses	755.25	844.96	852.88	870.52	993.44	1,158.84	1,210.96	1,170.34	1,295.04	1

26

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
					</					

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
						Owt				
Milk per cow	113.21	117.02	120.32	120.73	121.05	126.24	129.77	131.39	133.97	133.44
						Dollars				
Cash receipts:										
Milk	925.52	1,092.81	1,126.88	1,243.65	1,432.46	1,606.46	1,755.65	1,756.94	1,791.97	1,775.04
Cull cows, calves, and replacements	67.49	81.23	82.78	121.33	173.47	168.18	153.12	142.27	138.90	132.46
Total	993.01	1,174.04	1,209.66	1,364.98	1,605.93	1,774.64	1,908.77	1,899.21	1,930.87	1,907.50
Cash expenses:										
Feed--										
Silage	25.16	29.02	25.88	24.01	28.63	34.22	32.44	34.22	34.63	37.90
Concentrates	323.20	336.29	337.27	341.85	383.65	424.07	467.14	452.78	513.77	507.31
Hay	57.37	66.17	59.02	54.74	65.29	78.04	73.97	73.93	85.69	76.80
Pasture and other forages	7.04	8.12	7.24	6.72	8.01	9.58	9.08	7.85	7.73	7.93
Haylage	24.15	27.85	24.85	23.04	27.48	32.85	31.14	30.66	37.74	31.92
Other										
Milk hauling	36.42	37.69	39.58	41.42	48.71	56.68	62.28	61.80	63.01	62.74
Artificial insemination fees	8.85	9.65	10.45	11.10	12.64	13.79	15.57	16.80	17.24	17.82
Veterinary and medicine	18.40	20.10	20.42	21.06	22.61	24.41	25.95	27.67	28.70	29.75
Livestock hauling	1.03	1.03	1.05	1.10	1.28	1.57	1.30	1.84	1.76	1.73
Marketing	7.88	8.14	8.37	8.82	10.19	11.44	12.98	13.21	13.60	14.15
Fuel, lube, and electricity	28.73	30.36	32.64	34.27	44.72	63.59	70.07	70.07	65.96	56.91
Machinery and building repairs	38.56	37.81	37.81	39.32	43.48	48.48	53.20	57.20	59.03	57.64
Hired labor	51.41	56.25	60.49	64.72	70.77	77.35	88.24	85.95	87.08	91.03
DHIA fees	3.91	4.26	4.61	4.90	5.58	6.13	6.49	7.47	7.62	7.91
Dairy supplies	15.88	16.92	17.45	18.84	21.81	24.21	25.95	25.95	26.69	27.25
Dairy assessment									64.35	66.72
Total, variable expenses	647.99	689.66	687.13	695.91	794.85	906.41	975.80	967.40	1,114.60	1,095.51
General farm overhead	21.06	26.02	28.54	34.48	45.92	57.93	69.59	87.01	60.15	78.17
Taxes and insurance	14.93	17.58	19.93	24.09	34.08	41.62	46.72	47.30	56.39	52.73
Interest	81.81	96.16	96.45	110.15	144.75	179.28	217.77	224.02	227.65	242.44
Total, fixed expenses	117.80	139.76	144.92	168.72	224.75	278.83	334.08	358.33	344.19	373.34
Total, cash expenses	765.79	829.42	832.05	864.63	1,019.60	1,185.24	1,309.88	1,325.73	1,458.79	1,468.85
Receipts less cash expenses	227.22	344.62	377.61	500.35	586.33	589.40	598.89	573.48	472.08	438.65
Capital replacement	111.37	121.36	129.33	156.39	206.73	234.93	246.54	236.50	250.19	241.63
Receipts less cash expenses and replacements	115.85	223.26	248.28	343.96	379.60	354.47	352.35	336.98	221.98	197.02
Economic (full-ownership) costs:										
Variable expenses	647.99	689.66	687.13	695.91	794.85	906.41	975.80			

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Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Milk per cow	121.27	125.83	127.47	130.41	133.05	136.60	138.77	140.17	143.99	141.86
Cash receipts:										
Milk	1,091.52	1,274.27	1,283.29	1,414.52	1,634.67	1,807.89	1,945.56	1,947.16	1,998.89	1,948.74
Cull cows, calves, and replacements	77.84	93.74	94.93	133.88	190.21	185.02	166.52	153.73	147.53	143.19
Total	1,169.36	1,368.01	1,378.22	1,548.40	1,824.88	1,992.91	2,112.08	2,100.89	2,146.42	2,091.93
Cash expenses:										
Feed—										
Silage	41.98	48.41	43.18	40.05	47.77	57.10	54.12	54.67	59.84	59.14
Concentrates	317.34	340.13	353.24	353.19	402.70	458.33	503.74	476.30	499.41	501.24
Hay	55.97	64.55	57.58	53.40	63.69	76.13	72.16	88.60	74.13	71.42
Pasture and other forages	3.23	3.72	3.32	3.08	3.67	4.39	4.16	4.22	3.92	4.07
Haylage	24.76	28.55	25.47	23.62	28.17	33.68	31.92	29.06	32.07	31.24
Other—										
Milk hauling	30.24	31.40	32.50	34.68	41.57	47.92	52.73	52.52	53.75	53.73
Artificial insemination fees	9.61	10.48	11.35	12.06	13.73	14.97	16.65	18.13	18.41	19.24
Veterinary and medicine	22.05	24.08	24.47	25.23	27.09	29.25	31.92	32.77	34.13	35.17
Livestock hauling	1.36	1.36	1.39	1.45	1.69	2.08	2.77	2.39	2.31	2.25
Marketing	8.19	8.49	8.60	8.80	12.46	14.33	15.26	15.71	16.14	16.31
Fuel, lube, and electricity	23.74	25.09	26.98	28.33	36.96	51.64	56.90	56.03	55.44	49.91
Machinery and building repairs	33.69	33.03	33.03	34.35	37.98	42.33	47.18	49.15	51.00	49.50
Hired labor	84.91	92.90	99.90	106.89	116.88	124.65	134.61	146.80	150.50	161.19
DHIA fees	3.95	4.31	4.66	4.95	5.64	6.20	6.94	7.43	7.67	7.90
Dairy supplies	17.68	18.84	19.42	20.98	24.28	23.64	24.98	25.08	25.95	26.34
Dairy assessment									69.11	70.93
Total, variable expenses	678.70	735.34	745.09	751.06	864.28	986.64	1,056.04	1,058.86	1,153.78	1,159.58
General farm overhead	23.89	29.20	31.31	37.67	50.26	62.66	74.16	77.57	73.47	88.81
Taxes and insurance	16.10	19.47	21.84	25.26	34.91	42.44	47.18	44.85	46.86	47.24
Interest	59.15	68.79	67.46	76.71	100.98	123.61	147.94	154.07	157.33	159.41
Total, fixed expenses	99.14	117.46	120.61	139.64	186.15	228.71	269.28	276.49	277.66	295.46
Total, cash expenses	777.84	852.80	865.70	890.70	1,050.43	1,215.35	1,325.32	1,335.35	1,431.44	1,455.04
Receipts less cash expenses	391.52	515.21	512.52	657.70	774.45	777.56	786.76	765.54	714.98	636.89
Capital replacement	111.13	124.38	131.14	151.69	195.91	221.65	230.36	221.47	229.87	227.38
Receipts less cash expenses and replacements	280.39	390.83	381.38	506.01	578.54	555.91	556.40	544.07	485.11	409.51
Economic (full-ownership) costs:										
Variable expenses	678.70	735.34	745.09	751.06	864.28	986.64	1,056.04	1,058.86	1,153.78	1,159.58
Taxes and insurance	16.10	19.47	21.84	25.26	34.91	42.44	47.18	44.85	46.86	

Appendix table 9--Milk production costs per cwt, Pacific

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
	<u>Cwt</u>									
Milk per cow	138.66	145.96	149.40	145.59	148.72	155.48	158.01	159.04	161.33	164.39
	<u>Dollars</u>									
Cash receipts:										
Milk	8.97	9.34	9.70	10.27	11.49	12.85	13.46	13.23	13.10	12.89
Cull cows, calves, and replacements	.69	.78	.77	1.17	1.16	1.04	.93	.86	.85	.82
Total	9.66	10.12	10.47	11.44	12.65	13.89	14.39	14.09	13.95	13.71
Cash expenses:										
Feed--										
Silage	.13	.15	.13	.12	.14	.16	.15	.16	.16	.16
Concentrates	2.49	2.48	2.50	2.58	3.13	3.77	3.59	3.33	3.48	3.46
Hay	1.92	2.10	1.83	1.74	2.03	2.33	2.17	2.21	2.43	2.19
Pasture and other forages	.03	.03	.03	.02	.03	.03	.03	.03	.03	.03
Haylage	.11	.12	.10	.10	.11	.13	.12	.12	.12	.11
Other--										
Milk hauling	.20	.20	.21	.21	.25	.28	.29	.30	.30	.30
Artificial insemination fees	.07	.07	.07	.08	.09	.09	.11	.11	.11	.11
Veterinary and medicine	.11	.11	.11	.12	.12	.13	.14	.14	.14	.14
Livestock hauling	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
Marketing	.09	.10	.10	.08	.13	.14	.15	.16	.16	.17
Fuel, lube, and electricity	.11	.11	.11	.12	.16	.23	.24	.23	.21	.18
Machinery and building repairs	.32	.29	.29	.31	.33	.34	.39	.41	.41	.39
Hired labor	.63	.66	.69	.76	.81	.86	.90	.95	.96	1.02
DHIA fees	.03	.03	.04	.04	.04	.05	.05	.05	.06	.06
Dairy supplies	.12	.12	.13	.14	.16	.17	.18	.18	.18	.18
Dairy assessment									.48	.50
Total, variable expenses	6.37	6.58	6.35	6.43	7.54	8.72	8.52	8.39	9.24	9.01
General farm overhead	.13	.14	.15	.18	.23	.28	.33	.36	.30	.38
Taxes and insurance	.05	.06	.07	.10	.14	.15	.16	.15	.16	.14
Interest	.53	.55	.56	.61	.76	.93	1.09	1.18	1.17	1.01
Total, fixed expenses	.71	.75	.78	.89	1.13	1.36	1.58	1.69	1.63	1.53
Total, cash expenses	7.08	7.33	7.13	7.32	8.67	10.08	10.10	10.08	10.87	10.54
Receipts less cash expenses	2.58	2.79	3.34	4.12	3.98	3.81	4.29	4.01	3.08	3.17
Capital replacement	.36	.41	.44	.60	.83	.83	.81	.78	.79	.76
Receipts less cash expenses and replacements	2.22	2.38	2.90	3.52	3.15	2.98	3.48	3.23	2.29	2.41
Economic (full-ownership) costs:										
Variable expenses	6.37	6.58	6.35	6.43	7.54	8.72	8.52	8.39	9.24	9.01
Taxes and insurance	.05	.06	.07	.10	.14	.15	.16	.15	.16	.14
General farm overhead	.13	.14	.15	.18	.23	.28	.33	.36	.30	.38
Capital replacement	.36	.41	.44	.60	.83	.83	.81	.78	.79	.76
Allocated returns to owned inputs--										
Returns to operating capital	.08	.07	.07	.10	.12	.13	.16	.12	.12	.12
Returns to other nonland capital	.29	.34	.36	.50	.69	.71	.69	.66	.62	.57
Land	.04	.04	.05	.05	.06	.07	.07	.07	.07	.05
Unpaid labor	.25	.26	.28	.31	.33	.34	.36	.38	.39	.41
Total, economic costs	7.57	7.90	7.77	8.27	9.94	11.23	11.10	10.91	11.69	11.44
Residual returns to management and risk	2.09	2.22	2.70	3.17	2.71	2.66	3.29	3.18	2.26	2.27
Total, returns to owned inputs	2.75	2.93	3.46	4.13	3.91	3.91	4.57	4.41	3.46	3.42

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Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
						Cwt				
Milk per cow	138.66	145.96	149.40	145.59	148.72	155.48	158.01	159.04	161.33	164.39
						Dollars				
Cash receipts:										
Milk	1,243.65	1,363.08	1,449.21	1,495.51	1,708.89	1,996.88	2,126.81	2,103.61	2,114.54	2,120.16
Cull cows, calves, and replacements	96.05	114.05	115.66	170.26	173.19	162.22	146.95	136.99	136.67	135.51
Total	1,339.70	1,477.13	1,564.87	1,665.77	1,882.08	2,159.10	2,273.76	2,240.60	2,251.21	2,255.67
Cash expenses:										
Feed--										
Silage	18.38	21.20	18.91	17.54	20.92	25.00	23.70	25.16	25.82	26.38
Concentrates	345.25	361.41	373.32	375.34	465.48	586.35	567.26	529.74	561.42	568.60
Hay	265.94	306.71	273.58	253.73	302.63	361.74	342.88	351.21	391.19	359.60
Pasture and other forages	3.68	4.24	3.78	3.51	4.18	5.00	4.74	4.70	4.69	4.82
Haylage	14.71	16.96	15.13	14.03	16.73	20.00	18.96	19.32	19.58	18.85
Other--										
Milk hauling	27.88	29.38	30.72	31.22	36.82	43.34	45.82	47.28	48.26	48.97
Artificial insemination fees	9.28	10.13	10.96	11.65	13.26	14.46	17.38	17.54	18.08	18.57
Veterinary and medicine	14.94	16.32	16.59	17.10	18.36	19.82	22.12	22.26	23.20	23.81
Livestock hauling	1.26	1.26	1.29	1.35	1.57	1.93	1.58	2.23	2.15	2.09
Marketing	12.02	14.76	15.11	11.57	19.72	22.19	23.70	25.56	25.85	27.72
Fuel, lube, and electricity	15.10	15.96	17.16	18.02	23.51	35.50	37.92	36.91	33.84	29.63
Machinery and building repairs	43.80	42.94	42.94	44.66	49.38	52.78	61.63	64.25	66.92	64.32
Hired labor	87.90	96.17	103.41	110.65	120.99	134.38	142.21	151.21	155.92	167.14
DHIA fees	4.59	5.01	5.42	5.76	6.56	7.19	7.90	8.66	8.93	9.19
Dairy supplies	17.00	18.12	18.68	20.17	23.35	25.97	28.44	27.67	28.61	28.99
Dairy assessment									77.44	82.19
Total, variable expenses	881.73	960.57	947.00	936.30	1,123.46	1,355.65	1,346.24	1,333.70	1,491.90	1,480.87
General farm overhead	17.80	20.51	23.12	26.36	33.71	44.15	51.93	56.18	48.18	61.83
Taxes and insurance	6.99	9.06	10.50	14.01	21.09	23.83	25.28	23.86	25.32	24.17
Interest	73.36	80.41	82.93	89.34	112.75	144.97	172.42	187.40	188.20	166.92
Total, fixed expenses	98.15	109.98	116.55	129.71	167.55	212.95	249.63	267.44	261.70	252.92
Total, cash expenses	979.88	1,070.55	1,063.55	1,066.01	1,291.01	1,568.60	1,595.87	1,601.14	1,753.60	1,733.79
Receipts less cash expenses	359.82	406.58	501.32	599.76	591.07	590.50	677.89	639.46	497.61	521.88
Capital replacement	50.05	60.00	65.39	87.27	122.73	129.03	127.99	124.05	127.57	124.73
Receipts less cash expenses and replacements	309.77	346.58	435.93	512.49	468.34	461.47	549.90	515.41	370.04	397.15
Economic (full-ownership) costs:										
Variable expenses	881.73	960.57	947.00	936.30	1,123.46	1,355.65	1,346.24	1,333.70	1,491.90	1,480.87
Taxes and insurance	6.99	9.06	10.50	14.01	21.09	23.83	25.28	23.86	25.32	24.17
General farm overhead	17.80	20.51	23.12	26.36	33.71	44.15	51.93	56.18	48.18	61.83
Capital replacement	50.05	60.00	65.39	87.27	122.73	129.03	127.99	124.05	127.57	124.73
Allocated returns to owned inputs--										
Returns to operating capital	11.23	9.66	10.11	13.90	18.38	20.87	25.28	19.32	19.25	18.98
Returns to other nonland capital	39.65	49.26	54.32	72.83	102.41	110.17	109.03	104.97	101.31	94.69
Land	4.88	5.80	6.83	7.47	8.57	10.17	11.06	11.13	11.45	8.10
Unpaid labor	35.29	38.61	41.52	44.42	48.58	52.31	56.88	60.77	64.59	68.39
Total, economic costs	1,047.62	1,153.47	1,158.79	1,202.56	1,478.93	1,746.18	1,753.69	1,733.98	1,889.57	1,881.76
Residual returns to management and risk	292.08	323.66	406.08	463.21	403.15	412.92	520.07	506.62	361.64	373.91
Total, returns to owned inputs	383.13	426.99	518.86	601.83	581.09	606.44	722.32	702.81	558.24	564.07

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
						Cwt				
Milk per cow	111.24	119.41	123.61	127.47	125.39	132.04	130.70	132.70	137.80	138.85
						Dollars				
Cash receipts:										
Milk	9.45	10.60	10.70	11.60	13.10	13.90	14.80	14.60	14.50	14.30
Cull cows, calves, and replacements	.50	.59	.58	.85	1.30	1.12	1.04	.93	.90	.84
Total	9.95	11.19	11.28	12.45	14.40	15.02	15.84	15.53	15.40	15.14
Cash expenses:										
Feed--										
Silage	.05	.05	.04	.04	.05	.05	.05	.05	.06	.07
Concentrates	3.75	3.57	3.57	3.66	4.05	4.68	5.15	4.64	4.35	4.55
Hay	1.57	1.68	1.45	1.31	1.58	1.80	1.72	1.68	1.88	2.39
Pasture and other forages	.04	.04	.03	.03	.04	.04	.04	.04	.04	.04
Haylage	.09	.10	.08	.08	.09	.10	.10	.10	.10	.13
Other--										
Milk hauling	.34	.34	.35	.36	.42	.47	.50	.41	.41	.42
Artificial insemination fees	.05	.05	.05	.06	.07	.07	.08	.08	.08	.08
Veterinary and medicine	.11	.11	.11	.11	.12	.12	.14	.14	.14	.14
Livestock hauling					.01	.01	.01	.01	.01	.01
Marketing	.15	.15	.15	.15	.15	.17	.19	.19	.19	.20
Fuel, lube, and electricity	.14	.14	.15	.15	.20	.28	.31	.30	.28	.24
Machinery and building repairs	.15	.13	.13	.13	.15	.15	.17	.18	.18	.17
Hired labor	.77	.79	.82	.85	.94	.98	1.15	1.21	1.13	1.06
DHIA fees	.01	.01	.01	.01	.01	.01	.02	.02	.02	.02
Dairy supplies	.22	.22	.22	.23	.27	.28	.30	.30	.30	.30
Dairy assessment									.48	.50
Total, variable expenses	7.44	7.38	7.16	7.17	8.15	9.21	9.93	9.35	9.65	10.32
General farm overhead	.19	.22	.24	.28	.36	.43	.51	.73	.44	.43
Taxes and insurance	.07	.08	.09	.10	.18	.24	.27	.26	.25	.22
Interest	.51	.58	.56	.63	.81	.95	1.13	1.09	1.08	1.32
Total, fixed expenses	.77	.88	.89	1.01	1.35	1.62	1.91	2.08	1.77	1.97
Total, cash expenses	8.21	8.26	8.05	8.18	9.50	10.83	11.84	11.43	11.42	12.29
Receipts less cash expenses	1.74	2.93	3.23	4.27	4.90	4.19	4.00	4.10	3.98	2.85
Capital replacement	.45	.47	.49	.55	.95	1.17	1.24	1.23	1.16	1.15
Receipts less cash expenses and replacements	1.29	2.46	2.74	3.72	3.95	3.02	2.76	2.87	2.82	1.70
Economic (full-ownership) costs:										
Variable expenses	7.44	7.38	7.16	7.17	8.15	9.21	9.93	9.35	9.65	10.32
Taxes and insurance	.07	.08	.09	.10	.18	.24	.27	.26	.25	.22
General farm overhead	.19	.22	.24	.28	.36	.43	.51	.73	.44	.43
Capital replacement	.45	.47	.49	.55	.95	1.17	1.24	1.23	1.16	1.15
Allocated returns to owned inputs--										
Returns to operating capital	.09	.08	.08	.10	.14	.15	.18	.14	.12	.13
Returns to other nonland capital	.24	.25	.27	.31	.53	.66	.70	.71	.65	.62
Land	.10	.11	.13	.14	.16	.18	.20	.24	.21	.25
Unpaid labor	.55	.56	.58	.60	.67	.68	.75	.79	.74	.71
Total, economic costs	9.13	9.15	9.04	9.25	11.14	12.72	13.78			

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Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
						Cwt				
Milk per cow	111.24	119.41	123.61	127.47	125.39	132.04	130.70	132.70	137.80	138.85
						Dollars				
Cash receipts:										
Milk	1,051.26	1,265.73	1,322.65	1,478.63	1,642.61	1,830.62	1,934.36	1,937.40	1,998.11	1,985.58
Cull cows, calves, and replacements	55.47	71.04	71.30	108.92	162.43	147.23	135.93	123.24	124.30	116.07
Total	1,106.73	1,336.77	1,393.95	1,587.55	1,805.04	1,977.85	2,070.29	2,060.64	2,122.41	2,101.65
Cash expenses:										
Feed—										
Silage	5.07	5.85	5.22	4.84	5.77	6.90	6.54	6.65	8.11	9.79
Concentrates	417.13	426.49	441.82	466.82	507.82	616.14	673.10	616.00	600.00	632.09
Hay	174.35	201.08	179.37	166.35	198.41	237.16	224.80	222.98	259.19	331.82
Pasture and other forages	4.06	4.68	4.17	3.87	4.62	5.52	5.23	5.04	4.91	5.01
Haylage	10.14	11.69	10.43	9.67	11.54	13.79	13.07	13.01	13.30	18.18
Other—										
Milk hauling	37.58	40.38	42.69	45.92	52.66	61.90	65.35	54.41	56.50	58.32
Artificial insemination fees	5.75	6.27	6.79	7.21	8.21	8.95	10.46	10.84	11.17	11.50
Veterinary and medicine	12.36	13.50	13.72	14.15	15.19	16.41	18.30	18.38	19.14	19.71
Livestock hauling	.55	.56	.57	.59	.69	.85	1.31	.98	.95	.92
Marketing	16.84	18.48	19.13	19.73	18.81	22.39	24.83	25.21	26.18	27.77
Fuel, lube, and electricity	15.81	16.71	17.97	18.87	24.62	36.92	40.52	40.31	38.02	34.57
Machinery and building repairs	16.18	15.86	15.86	16.50	18.24	20.26	22.22	24.18	25.19	24.30
Hired labor	85.98	94.07	101.15	108.23	118.35	128.97	150.30	160.85	156.09	147.29
DHIA fees	1.07	1.17	1.26	1.34	1.53	1.70	2.61	2.02	2.08	2.14
Dairy supplies	24.45	26.07	26.87	29.02	33.59	37.29	39.21	39.65	40.98	41.65
Dairy assessment									66.14	69.43
Total, variable expenses	827.32	882.86	887.02	913.11	1,020.05	1,215.15	1,297.85	1,240.51	1,327.95	1,434.49
General farm overhead	20.76	26.21	29.09	35.47	45.66	57.12	66.77	97.58	60.84	59.53
Taxes and insurance	7.79	9.30	10.72	12.45	22.57	31.56	35.29	34.50	35.78	32.79
Interest	57.24	68.73	69.76	80.42	102.13	125.43	148.27	144.94	149.21	183.26
Total, fixed expenses	85.79	104.24	109.57	128.34	170.36	214.11	250.33	277.02	245.83	275.58
Total, cash expenses	913.11	987.10	996.59	1,041.45	1,190.41	1,429.26	1,548.18	1,517.53	1,573.78	1,710.07
Receipts less cash expenses	193.62	349.67	397.36	546.10	614.63	548.59	522.11	543.11	548.63	391.58
Capital replacement	50.59	55.90	60.53	70.35	119.15	155.03	162.07	163.22	160.46	159.01
Receipts less cash expenses and replacements	143.03	293.77	336.83	475.75	495.48	393.56	360.04	379.89	388.17	232.57
Economic (full-ownership) costs:										
Variable expenses	827.32	882.86	887.02	913.11	1,020.05	1,215.15	1,297.85	1,240.51	1,327.95	1,434.49
Taxes and insurance	7.79	9.30	10.72	12.45	22.57	31.56	35.29	34.50	35.78	32.79
General farm overhead	20.76	26.21	29.09	35.47	45.66	57.12	66.77	97.58	60.84	59.53
Capital replacement	50.59	55.90	60.53	70.35	119.15	155.03	162.07	163.22	160.46	159.01
Allocated returns to owned inputs—										
Returns to operating capital	10.46	9.00	9.41	12.93	17.11	19.43	23.53	18.57	17.44	18.69
Returns to other nonland capital	26.56	30.41	33.32	38.90	65.89	87.72	91.49	94.22	88.90	84.58
Land	11.54	13.71	16.13	17.67	20.26	24.04	26.14	31.85	28.83	35.00
Unpaid labor	60.82	66.54	71.55	76.56	83.71	90.15	98.02	105.39	101.97	98.95
Total, economic costs	1,015.84	1,093.93	1,117.77	1,177.44	1,394.40	1,680.20	1,801.16	1,785.84	1,822.17	1,923.04
Residual returns to management and risk	90.89	242.84	276.18	410.11	410.64	297.65	269.13	274.80	300.24	178.61
Total, returns to owned inputs	200.27	362.50	406.59	556.17	597.61	518.99	508.31	524.83	537.38	415.83

Appendix table 13—Milk production costs per cwt, Upper Midwest

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
	<u>Cwt</u>									
Milk per cow	109.96	116.97	121.37	121.19	123.55	126.78	130.12	130.99	135.23	132.75
	<u>Dollars</u>									
Cash receipts:										
Milk	8.05	9.10	9.14	10.16	11.64	12.60	13.34	13.19	13.18	13.07
Cull cows, calves, and replacements	.77	.88	.87	1.24	1.75	1.64	1.51	1.37	1.30	1.28
Total	8.82	9.98	10.01	11.40	13.39	14.24	14.85	14.56	14.48	14.35
Cash expenses:										
Feed--										
Silage	.30	.33	.28	.26	.31	.36	.33	.34	.33	.37
Concentrates	2.51	2.48	2.32	2.32	2.60	2.74	2.78	2.75	2.90	2.96
Hay	.50	.55	.47	.44	.51	.60	.55	.55	.53	.53
Pasture and other forages	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
Haylage	.28	.31	.27	.25	.29	.34	.31	.29	.29	.28
Other--										
Milk hauling	.18	.18	.18	.19	.22	.24	.26	.25	.25	.25
Artificial insemination fees	.07	.07	.07	.08	.09	.09	.11	.11	.11	.12
Veterinary and medicine	.18	.18	.18	.19	.20	.21	.22	.22	.23	.24
Livestock hauling	.02	.02	.02	.02	.02	.03	.03	.03	.03	.03
Marketing	.05	.04	.05	.05	.05	.05	.06	.06	.06	.06
Fuel, lube, and electricity	.21	.20	.21	.22	.28	.40	.42	.43	.40	.36
Machinery and building repairs	.32	.29	.28	.29	.32	.35	.37	.39	.39	.38
Hired labor	.46	.47	.49	.52	.56	.58	.63	.67	.61	.67
DHIA fees	.03	.03	.03	.04	.04	.04	.05	.05	.05	.05
Dairy supplies	.12	.12	.12	.13	.15	.16	.17	.17	.17	.18
Dairy assessment									.48	.50
Total, variable expenses	5.25	5.29	4.99	5.02	5.66	6.21	6.31	6.33	6.85	7.00
General farm overhead	.22	.26	.28	.34	.45	.55	.64	.72	.62	.69
Taxes and insurance	.16	.18	.20	.23	.31	.37	.40	.40	.38	.42
Interest	.83	.94	.91	1.05	1.38	1.64	1.94	1.95	1.94	2.11
Total, fixed expenses	1.21	1.38	1.39	1.62	2.14	2.56	2.98	3.07	2.94	3.22
Total, cash expenses	6.46	6.67	6.38	6.64	7.80	8.77	9.29	9.40	9.79	10.22
Receipts less cash expenses	2.36	3.31	3.63	4.76	5.59	5.47	5.56	5.16	4.69	4.13
Capital replacement	1.06	1.12	1.16	1.37	1.70	1.87	1.91	1.86	1.84	1.83
Receipts less cash expenses and replacements	1.30	2.19	2.47	3.39	3.89	3.60	3.65	3.30	2.85	2.30
Economic (full-ownership) costs:										
Variable expenses	5.25	5.29	4.99	5.02	5.66	6.21	6.31	6.33	6.85	7.00
Taxes and insurance	.16	.18	.20	.23	.31	.37	.40	.40	.38	.42
General farm overhead	.22	.26	.28	.34	.45	.55	.64	.72	.62	.69
Capital replacement	1.06	1.12	1.16	1.37	1.70	1.87	1.91	1.86	1.84	1.83
Allocated returns to owned inputs--										
Returns to operating capital	.07	.06	.06	.08	.11	.12	.14	.11	.11	.11
Returns to other nonland capital	.63	.69	.72	.86	1.06	1.19	1.22	1.19	1.10	1.07
Land	.23	.26	.29	.32	.36	.42	.44	.43	.44	.43
Unpaid labor	1.32	1.36	1.41	1.51	1.62	1.70	1.80	1.97	1.79	1.96
Total, economic costs	8.94	9.22	9.11	9.73	11.27	12.43	12.86	13.01	13.13	13.51
Residual returns to management and risk	-.12	.76	.90	1.67	2.12	1.81	1.99	1.55	1.35	.84
Total, returns to owned inputs	2.13	3.13	3.38	4.44	5.27	5.24	5.59	5.25	4.79	4.41

Appendix table 14--Milk production costs per cow, Upper Midwest

Item	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
<u>Cwt</u>										
Milk per cow	109.96	116.97	121.37	121.19	123.55	126.78	130.12	130.99	135.23	132.75
<u>Dollars</u>										
Cash receipts:										
Milk	885.11	1,064.16	1,109.19	1,231.52	1,438.25	1,593.87	1,735.80	1,727.64	1,781.90	1,734.90
Cull cows, calves, and replacements	85.00	103.12	105.74	150.00	216.81	208.04	196.48	179.23	175.22	168.30
Total	970.11	1,167.28	1,214.93	1,381.52	1,655.06	1,801.91	1,932.28	1,906.87	1,957.12	1,903.20
Cash expenses:										
Feed--										
Silage	33.30	38.41	34.26	31.78	37.90	45.30	42.94	45.19	45.17	49.00
Concentrates	275.84	290.38	281.12	281.23	321.43	346.41	361.73	360.11	393.14	393.64
Hay	55.51	64.02	57.11	52.96	63.17	75.51	71.57	72.07	71.85	70.12
Pasture and other forages	2.02	2.33	2.07	1.92	2.29	2.74	2.60	2.32	2.18	2.58
Haylage	31.29	36.08	32.19	29.85	35.60	42.56	40.34	37.55	37.79	36.50
Other--										
Milk hauling	19.46	20.72	21.96	22.87	26.64	30.87	33.83	33.06	34.26	33.55
Artificial insemination fees	7.64	8.33	9.02	9.58	10.91	11.89	14.31	14.42	14.86	15.30
Veterinary and medicine	19.68	21.49	21.84	22.52	24.18	26.12	28.63	29.28	30.49	31.40
Livestock hauling	2.36	2.36	2.41	2.51	2.93	3.60	3.90	4.17	4.02	3.91
Marketing	5.06	5.18	5.51	5.50	6.49	6.90	7.81	8.37	8.66	8.54
Fuel, lube, and electricity	22.59	23.87	25.67	26.96	35.17	50.45	54.65	55.82	53.61	48.06
Machinery and building repairs	34.91	34.23	34.23	35.60	39.36	43.73	48.14	51.00	52.72	51.17
Hired labor	50.22	54.94	59.08	63.21	69.12	72.89	81.98	87.07	82.44	89.08
DHIA fees	3.51	3.83	4.15	4.41	5.02	5.51	6.51	6.63	6.83	7.04
Dairy supplies	13.65	14.55	15.00	16.20	18.75	20.81	22.12	22.10	22.86	23.22
Dairy assessment									64.91	66.37
Total, variable expenses	577.04	620.72	605.62	607.10	698.96	785.29	821.06	829.16	925.79	929.48
General farm overhead	24.40	30.68	34.00	41.39	56.14	69.78	83.56	92.88	84.09	91.81
Taxes and insurance	17.26	20.91	23.94	28.24	38.28	46.30	52.05	52.40	52.79	54.08
Interest	91.49	109.44	110.88	127.61	170.76	208.37	252.35	256.03	262.65	279.77
Total, fixed expenses	133.15	161.03	168.82	197.24	265.18	324.45	387.96	401.31	399.53	425.66
Total, cash expenses	710.19	781.75	774.44	804.34	964.14	1,109.74	1,209.02	1,230.47	1,325.32	1,355.14
Receipts less cash expenses	259.92	385.53	440.49	577.18	690.92	692.17	723.26	676.40	631.80	548.06
Capital replacement	116.52	130.66	140.62	165.88	210.11	236.45	248.53	243.65	247.17	242.98
Receipts less cash expenses and replacements	143.40	254.87	299.87	411.30	480.81	455.72	474.73	432.75	384.63	305.08
Economic (full-ownership) costs:										
Variable expenses	577.04	620.72	605.62	607.10	698.96	785.29	821.06	829.16	925.79	929.48
Taxes and insurance	17.26	20.91	23.94	28.24	38.28	46.30	52.05	52.40	52.79	54.08
General farm overhead	24.40	30.68	34.00	41.39	56.14	69.78	83.56	92.88	84.09	91.81
Capital replacement	116.52	130.66	140.62	165.88	210.11	236.45	248.53	243.65	247.17	242.98
Allocated returns to owned inputs--										
Returns to operating capital	8.10	6.97	7.29	10.02	13.25	15.04	18.22	14.87	14.44	14.43
Returns to other nonland capital	69.21	80.43	87.58	103.79	131.47	151.37	158.74	155.88	149.24	140.96
Land	25.27	30.03	35.33	38.69	44.37	52.66	57.25	56.33	59.30	57.24
Unpaid labor	145.32	159.00	170.96	182.93	200.03	215.41	234.22	257.69	243.05	261.62
Total, economic costs	983.12	1,079.40	1,105.34	1,178.04	1,392.61	1,572.30	1,673.63	1,702.86	1,775.87	1,792.60
Residual returns to management and risk	-13.01	87.88	109.59	203.48	262.45	229.61	258.65	204.01	181.25	110.60
Total, returns to owned inputs	234.89	364.31	410.75	538.91	651.57	664.09	727.08	688.78	647.28	584.85